C W Report

Chemical Week

May 19, 1956

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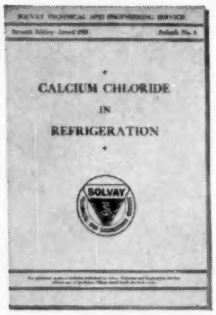
GE's Gibson sparks threefold jump in external chemical sales in six years . . . . . p. 20

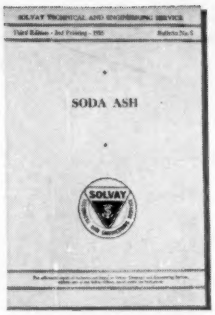
New promotion ideas churn up competition in the $60-million cleanser business . . . . . p. 118

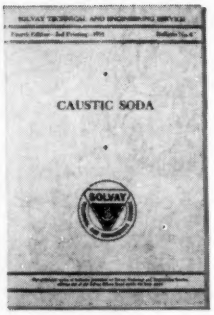
San Francisco: Wall Street of the West, its lures are money, shipping and research . . . . . p. 31

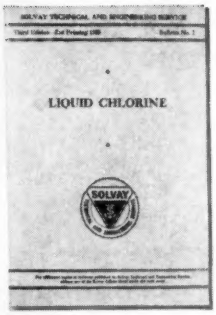
Shell's new 2-stage cracking process ups gasoline yields, holds down carbon output . . . . p. 135

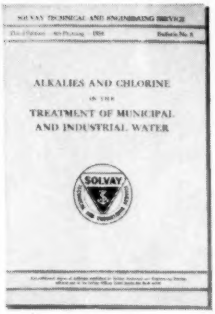
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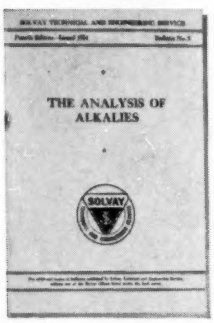


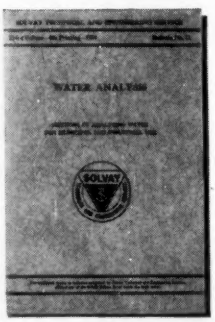


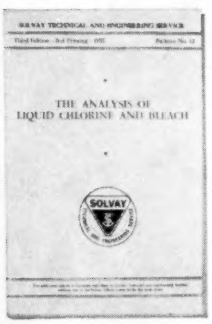


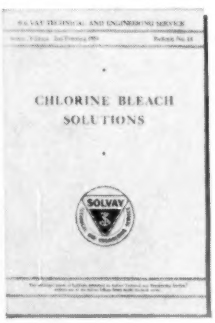


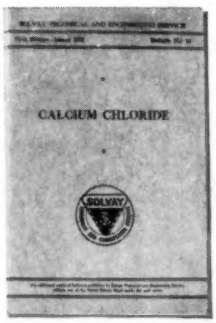
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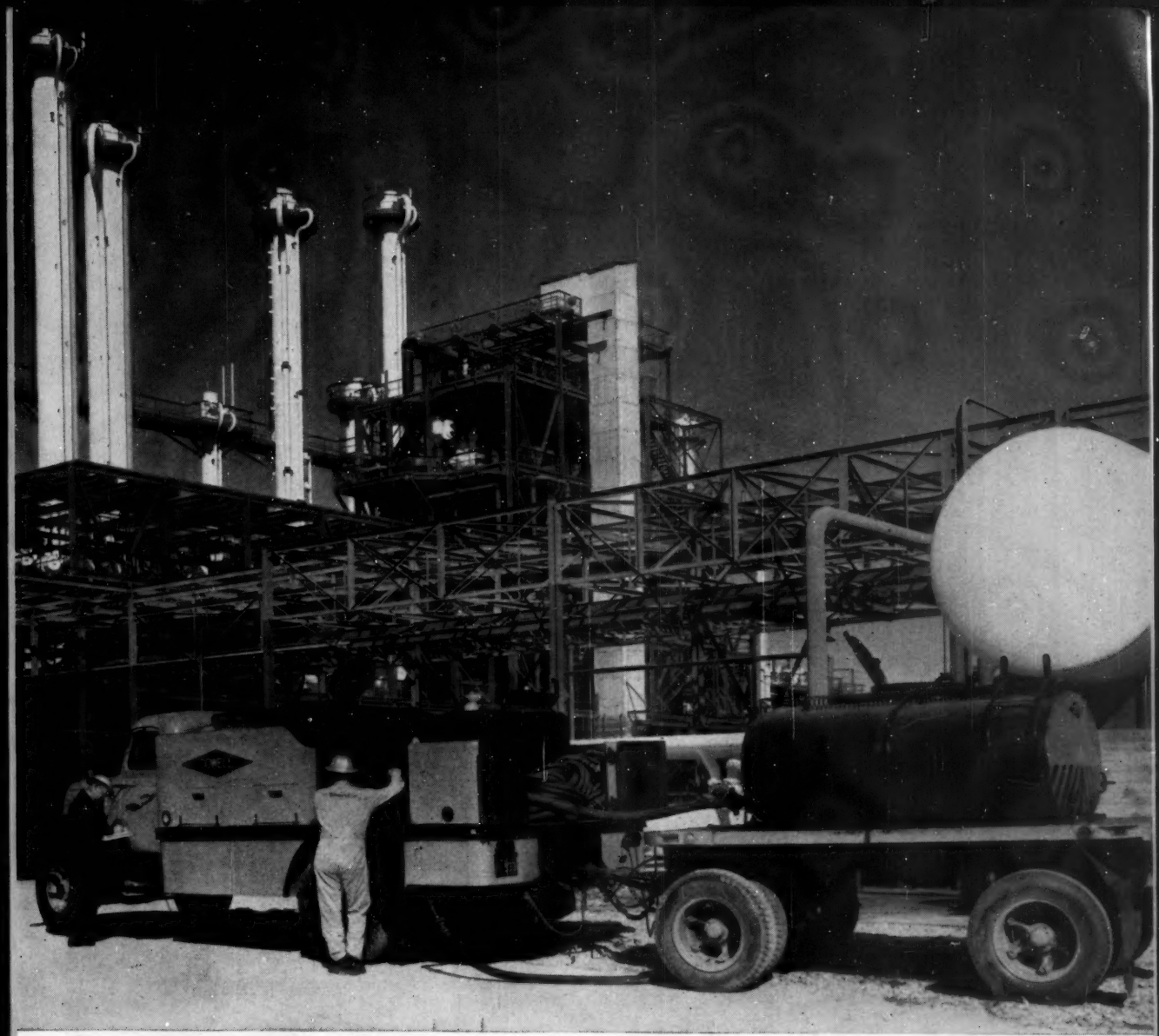
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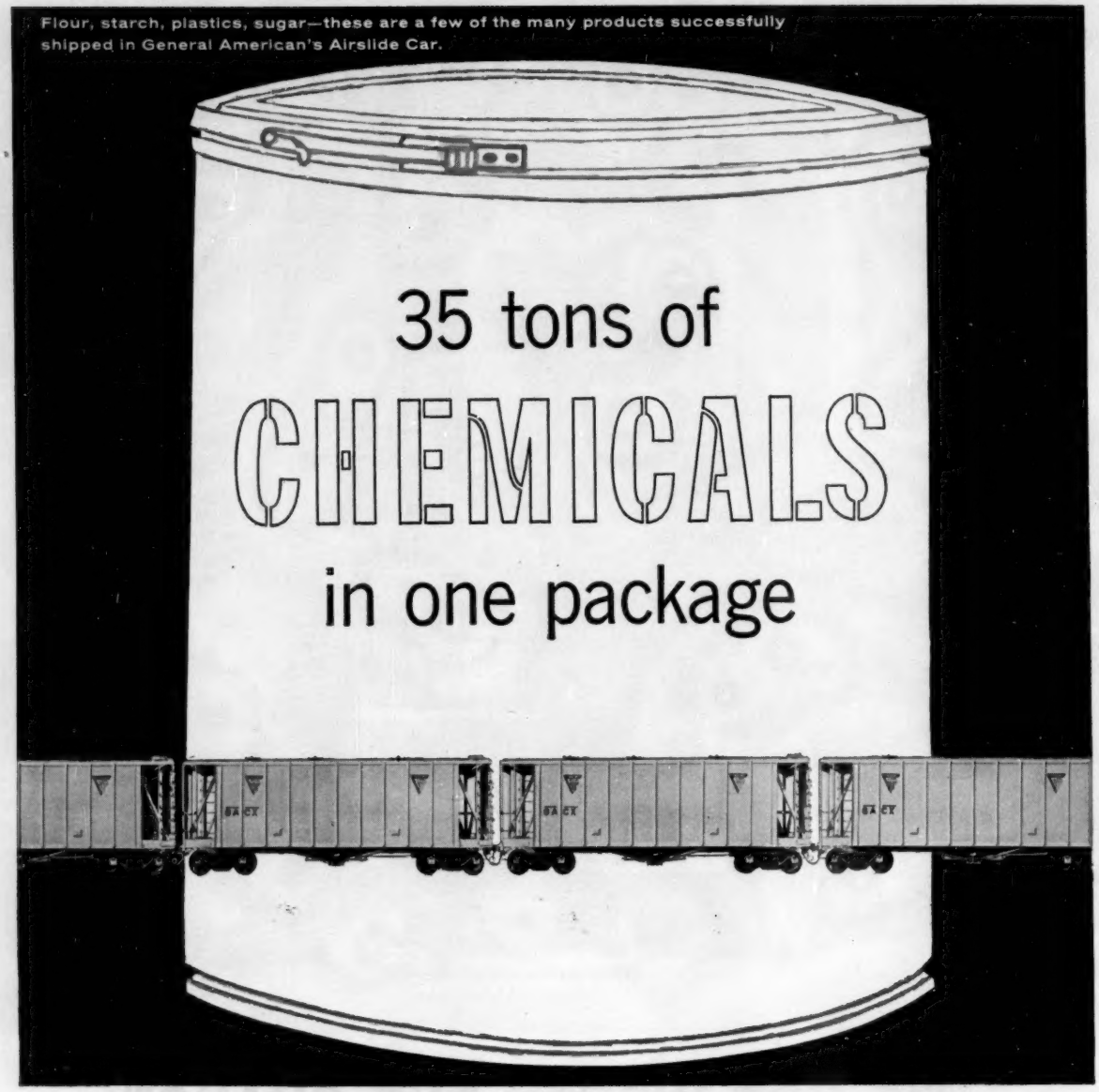
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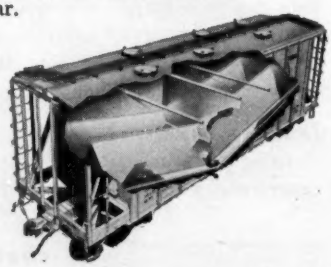
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Chemical Week

TOP OF THE WEEK May 19, 1956

The chemical industry heads for new records: here's what companies plan to spend for new plants during the next four years .....p. 16

How are your distributors faring? Business is up, but so are worries. Consensus: the future is excellent ....p. 52

New washable leathers offer boost to sagging leather glove industry .....p. 97

When will there be enough nickel? Still-acute shortage stirs Washington probers .....p. 154

9 BUSINESS NEWSLETTER

12 OPINION

15 UPCOMING MEETINGS

16 BUSINESS NEWS

19 Cosden and Grace officials push ahead to merger

Next big chemical center: Brunswick, Ga.

20 What's the big news at GE? Chemicals, as more and more outside buyers get in the act

22 WASHINGTON ANGLES

31 ADMINISTRATION
San Francisco: West Coast chemical and business center

36 For Air Reduction, diversifying into chemicals brings big boost in income

38 Chemical companies ante up as Britain seeks to bolster her technical manpower

47 CHARTING BUSINESS

52 SALES

56 Hucksterism must go, say drug sales executives

60 Parke, Davis turns to algebra in determining packaging labor needs

63 Likely: new ICC rules to allow more stainless steel tank trucks

69 CW REPORT
How to systematize corporate growth

97 RESEARCH

104 Quartermaster Corps ponders problems in food irradiation

106 High polymers: National Science Foundation pushes new basic research program

113 TECHNOLOGY NEWSLETTER

118 SPECIALTIES
Latest in the household cleanser scramble: tinted scouring powders

120 Modified cellulose rides high on PVAc paint boom

122 Treating wooden food containers ups fungicide sales

135 PRODUCTION
Shell unwraps new 2-stage cat cracking process

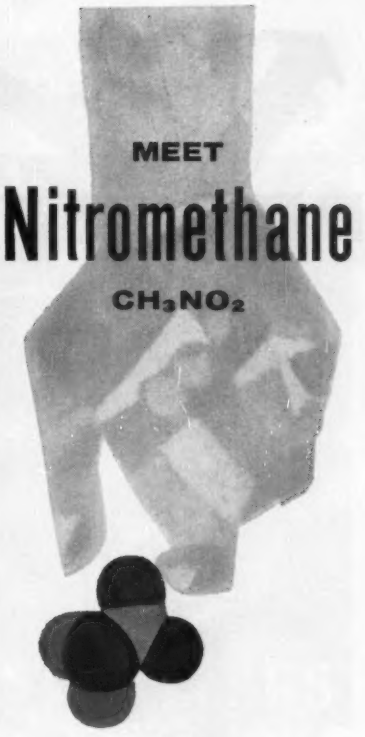
138 Process stream analyzers move from the lab to the plant

142 Artificial sunlight irradiates polio virus

151 MARKET NEWSLETTER

154 MARKETS

155 Congress gets rundown on rubber; a report by the President





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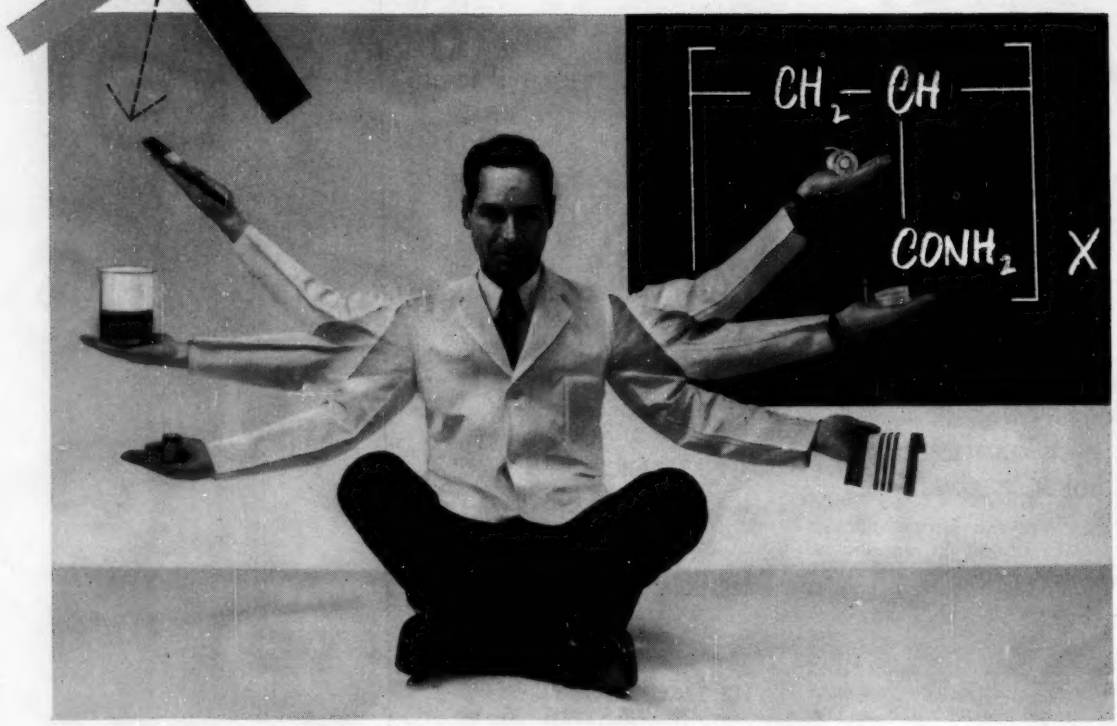
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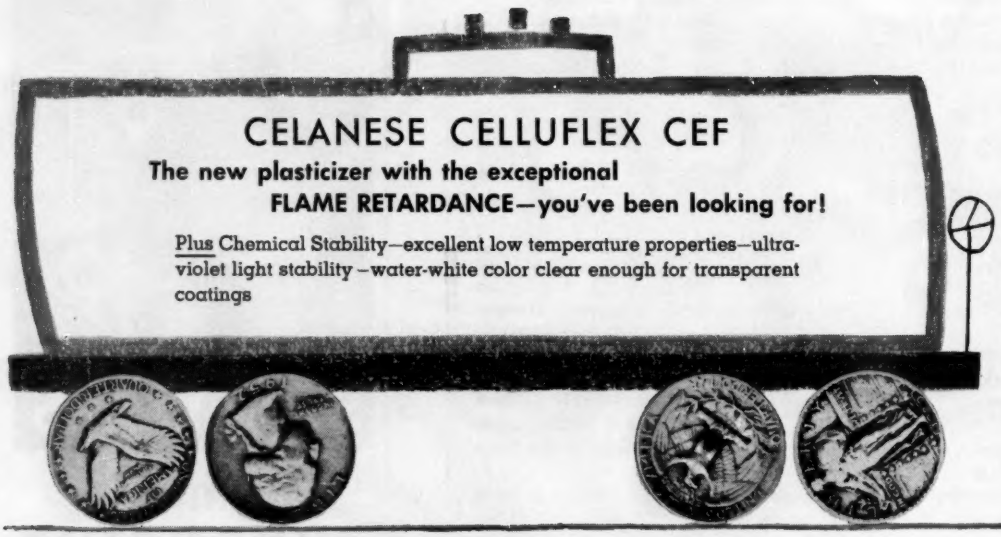
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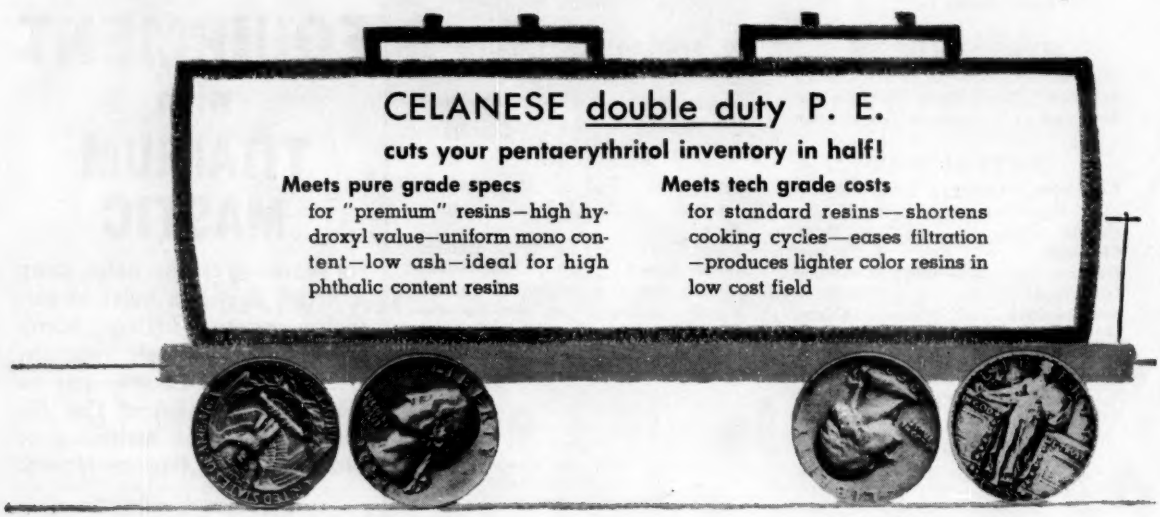
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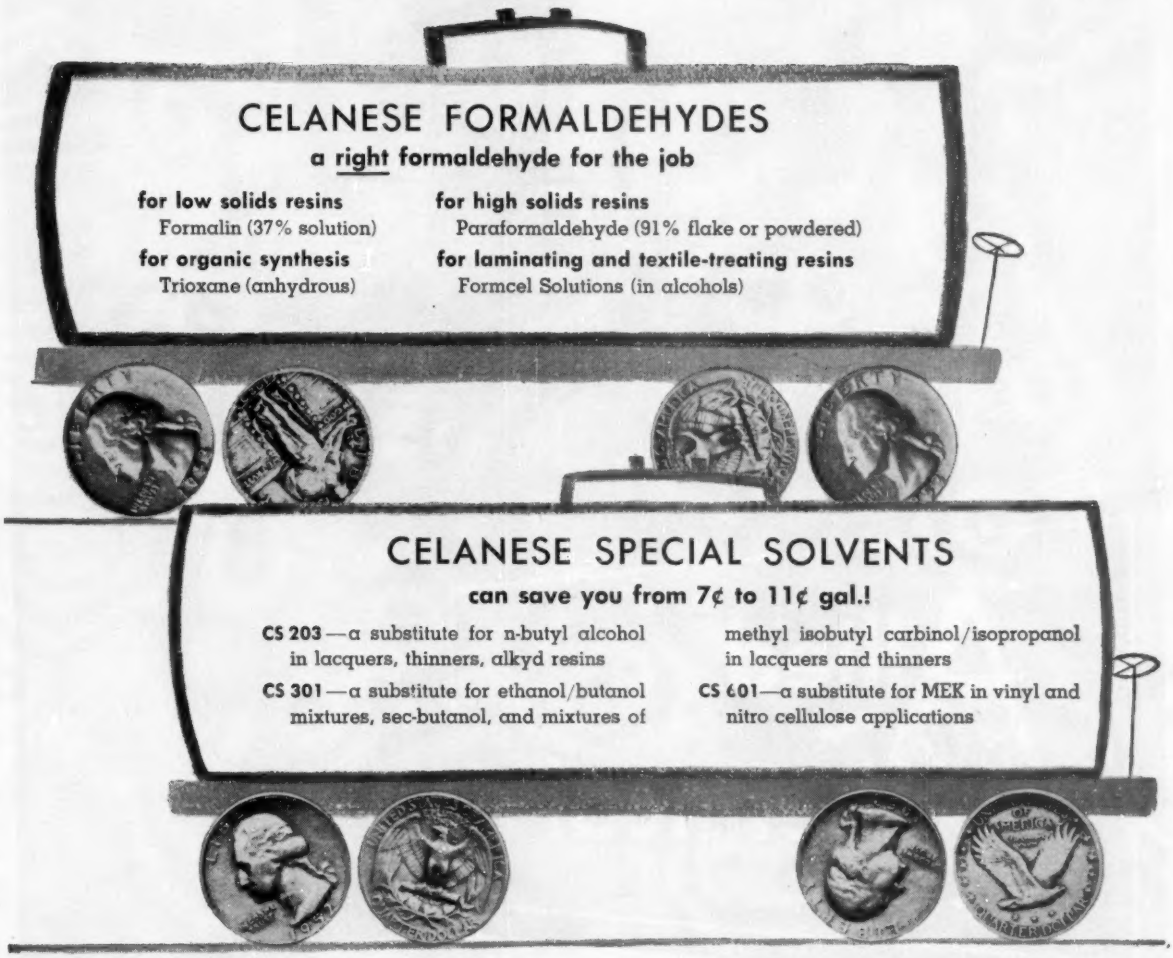
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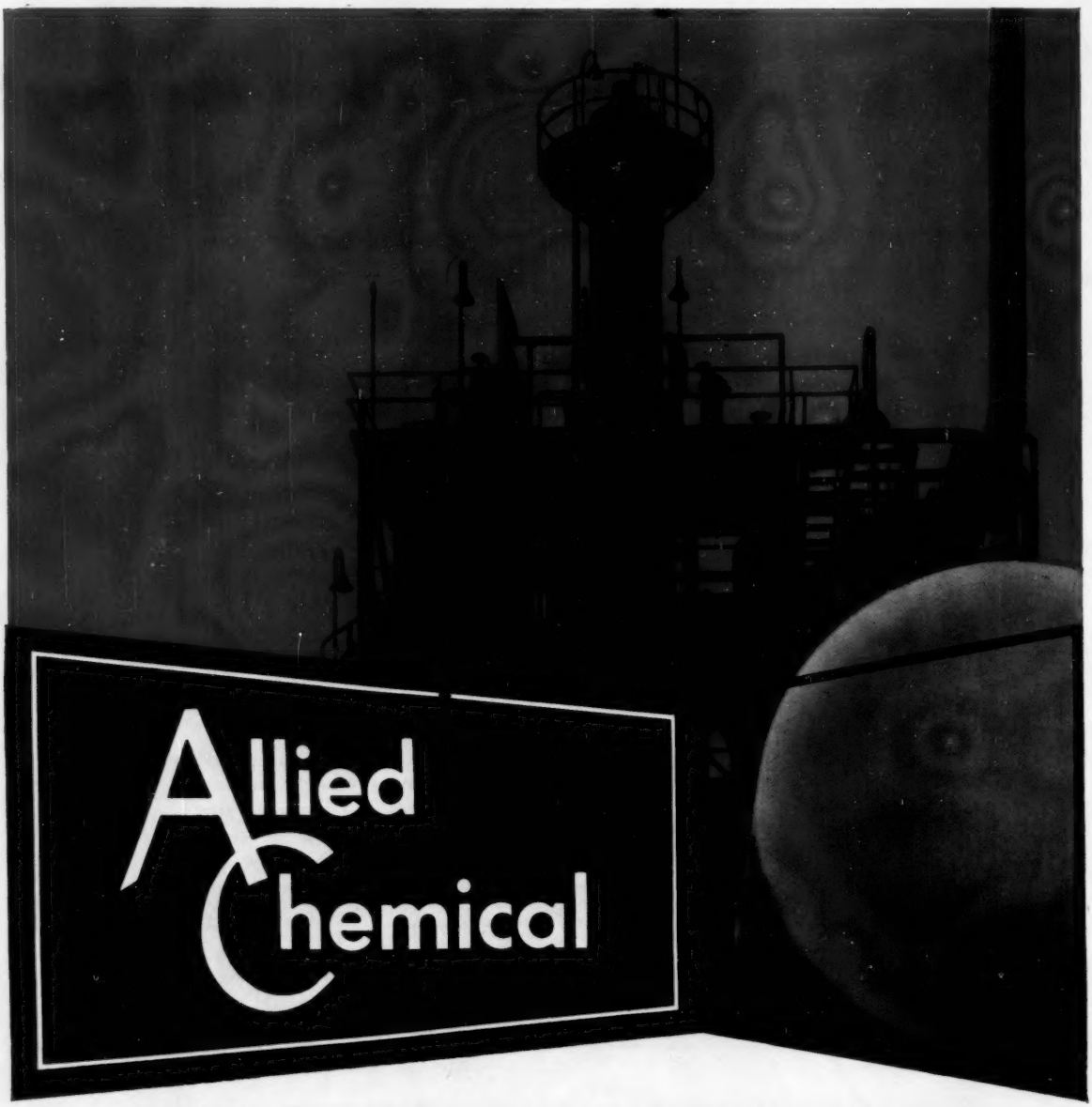
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Business

Newsletter

CHEMICAL WEEK
May 19, 1956

There was new word from Danville, Ill., this week, where a grand jury is investigating possible violation of federal antitrust statutes. The probe was alleged to originate with complaints made by Prairie States Oil and Grease Co. (Danville) (*CW Business Newsletter, May 12*). L. A. Stewart, of Prairie States, told CHEMICAL WEEK: "No complaint has been filed by us, although, along with 73 other firms, our books have been subpoenaed."

•

Chemical executives count on good business this year, as well as for several more years to come.

Confidence in the business outlook shows up in the McGraw-Hill survey of new plant spending (*p. 16*). No industry that looks for stationary or contracting markets would be planning to spend $1.5 billion on plants in each of the next four years.

These plans also show business confidence in the short-term outlook. A few years ago, substantial declines in production of automobiles, a slowdown in the buying of farm chemicals, or a letdown in the number of housing starts would have signaled cutback of plans for plant expansion. But not now. The growth outlook is generally undisturbed by substantial declines in these fields (even though, in the case of farm chemicals, some companies' profits may show declines).

Similarly, business is likely to remain calm even if this summer sees a letdown in steel production. It's estimated that some 20 million tons of steel is in inventory—about a two months' supply, at current output levels. Even the substantial problem of working off such inventory shouldn't mean a letup in over-all business levels, or of business confidence.

There's an economic "sleeper," too, that may make 1956 by far the best year the U. S. has ever seen—it's the rate at which personal income is rising. Personal income for '56 was estimated at $312.5 billion by the Treasury, when the year began. But the annual income rate during the first quarter hit $313 billion. March climbed to a $314.5-billion level, and the latest figures compiled privately for key government economists estimate that the rate should hit $318 billion by June. A good part of this gain stems from the March increase in minimum wages.

But wage increases expected in coming months, some experts now believe, will swell the total to the point where personal income could be running at a $324-billion/year rate by December. This points up the optimistic business climate, which presages a powerful demand for chemicals and chemical-derived products.

•

The business climate in Louisiana may be changing for the worse. At least that's what some chemical executives fear. The state's new governor, Earl K. Long, is pushing for a substantial increase in the sulfur production tax —now pegged at $1.03/long ton.

Some sources in Baton Rouge, where the state legislature convened this

Monday, even report that he wants to triple or quadruple the tax. Two companies would be primarily affected—Freeport and Jefferson Lake Sulfur, which mine sulfur in the state.

But the question facing chemical management in general is broader. Does the threat of such a tax foreshadow an unfriendly attitude in Louisiana to business in general?

•

Will Stauffer take over West End Chemical via merger? The answer almost certainly will be "yes," since West End management and Stauffer together control about two-thirds of the West End stock. But some minority stockholders are not too happy about the deal. Reason: since the merger proposal was first revealed (*CW Business Newsletter, March 17*), the over-all value of Stauffer stock has gone up approximately $45 million, but West End is up only $2 million.

Minority stockholders are asking West End President George Ellis two questions:

- Since other chemical companies have expressed interest in acquiring West End, has the company's management given them chances to come up with offers that might top Stauffer's?

- In conducting negotiations with Stauffer over terms of a merger, has West End's management taken into account the full extent of its boron reserves, and the current technological developments that may increase value of boron reserves in the next decade?

One possibility being considered by West End: sale or transfer to Stauffer of its manufacturing facilities along with rights to mine West End's ore reserves at a specified minimum rate. Such a plan would leave ownership of the reserves with West End.

•

Reichhold Chemicals and Gulf States Paper Corp. were the winners last week in a court case against the city of Tuscaloosa, Ala. The companies won a federal court ruling that said, in effect, that the city's $5,000/year business license tax on them was more than the city had a right to charge.

Meanwhile, Reynolds is defending another suit ($550,000), brought by a suburban Portland dairy, which argues that the company's fume control system is inadequate.

•

And here's a foreign-trade item worth noting. Involved: imports of benzene.

A 10,135-ton consignment of Russian benzene for Dow Chemical, first of five shipments to the company through New York, arrived last week. (Earlier shipments to Dow were made through Freeport and Montreal.) The shipments may mark a trend to increasing imports of benzene from Iron Curtain countries: One observer estimates that such shipments this year will hit 40 million gal.



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OPINION . . . . . .

Aerosols in the News

DEAR MR. JOHNSON: I would like to compliment CHEMICAL WEEK on the thoroughness of the article titled "Will Dries Reshuffle the Lineup?" (*March 17*).

It is really amazing the way various publications are now starting to highlight news of the aerosol (pressurized) industry.

H. E. PETERSON
President
Peterson Filling & Packaging Co.
Danville, Ill.

Germany and Ambergris

GENTLEMEN: We have read with much interest the article (*Feb. 4, p. 61*) "Free of the Whale's Whim" describing the efforts made by different manufacturers of aromatic chemicals to substitute the natural ambergris by a suitable and less expensive synthetic product.

You also mention our firm in your article . . . and we take, therefore, the liberty to send enclosed some descriptive literature.

We would appreciate it if you would see an opportunity to give due credit to our work in your magazine and thereby complete the information given about the subject of natural ambergris and its synthetic substitutes.

DRAGOCO
Holzminden
Germany

Science and Sales

DEAR MR. JOHNSON: Sales' comments in your article on Scientific Purchasing (*April 28, p. 100*) point up one of the weaknesses of today's chemical industry operations.

One of the axioms of scientific purchasing is:

> Perfect scientific purchasing practices lead, eventually, to complete satisfaction of *both* the buyer and the seller.

Understanding of the seller's processes, problems and costs is but the beginning of scientific purchasing. The larger problem is the coordination of the two organizations, particularly their personalities.

The effect of personalities cannot, and should not, be eliminated from the purchasing process. After all, the salesman and the purchasing agent both reflect the unique personalities of their respective organizations.

Possibly some of the sales people who seem to resent the use of scientific purchasing would find on more complete study that their best customers are the ones now using, either by plan or unintentionally, the principles of scientific purchasing.

May I suggest that sales look over their customer (they are few in number), who usually seems to know what he wants and when he wants it? That is one valuable result of scientific purchasing.

GEORGE H. TAFT
Concord, Mass.

Soviets and Fluoride

DEAR MR. OLCOTT: We note a short article . . . in regard to fluoridation that strongly implies that such treatment of water supplies is sound.

In this connection, therefore, we consider it of value to refer you to the enclosed copy of an article by George Racey Jordan. It seems to us that your organization would be doing a public service to get the facts about this water treatment situation before the public.

GEORGE B. FOWLER
Treasurer
Valley Paper Co.
Holyoke, Mass.

Typical of Major Jordan's arguments: "During the war, I learned how the Soviets used fluorides in the drinking water of Siberian prison camps to weaken the minds of their prisoners, to make them dull, cowlike and more resigned to their slavery."—ED.

Rayette and Raymond

DEAR MR. JOHNSON: I am writing in connection with the article on professional permanent wave preparations (*April 14*).

Permit me to point out that Rayette, Inc., introduced the "nonammonium thioglycolate-type wave" you refer to on page 44. Rayette, Inc., manufactures beauty aid preparations for the professional beautician.

Raymond Laboratories, Inc., a wholly owned subsidiary, produces only industrial chemicals "of cosmetic quality" for the chemical and chemical processing industries. Raymond Laboratories' products are sodium and other lauryl sulfates, quaternary ammonium compounds, and thioglycolic acid and its salts. . . .

J. C. ZEMLIN
Director, Manufacturing Research
Raymond Laboratories, Inc.
St. Paul, Minn.

Fewer Lawsuits, Too

DEAR MR. JOHNSON: We have read with a great deal of interest "Symbols of Quality" (*March 31*). It is obvious that as more intensive marketing programs develop in fields associated with chemicals, the requirement and need for improved and more comprehensive labeling and product information becomes as vital for plastics as it does for an industrial or agricultural chemical.

It would seem only logical, whenever an item is placed "on the shelf" for resale purposes, regardless of its nature or past identification, that complete and attractive identification, technical information, instructions for proper use and adequate warnings and cautions, if such are required, be incorporated. This, not only for the public knowledge, but also for optimum consumer satisfaction in the use of the particular product. . .

If this procedure is adhered to, I am sure that we shall not only have customers who are more satisfied than might otherwise be the case, but also fewer lawsuits and other problems to settle arising out of inadequate labeling and product identification.

Insofar as our own company is concerned, I believe you are aware that a short time ago we made a complete revision of our labels, package design and product information sheets with the idea in mind of incor-

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

porating the fundamentals mentioned above. We are happy to report that the acceptance of these changes from all facets of our distribution chain has been most encouraging, and we feel that they will be of long-range benefit to us.

WM. J. F. FRANCIS
Vice-Pres. in Charge of Sales
American Potash & Chemical Corp.
Los Angeles

2,200 Standards

DEAR MR. JOHNSON: [Re] . . . "Does the Seal Make a Sale?" (*March 31*) . . . As you probably know, we have about 2,200 standard methods of test and specifications for a very wide range of material. I am happy to note that you mention our Directory of Commercial and College Testing Laboratories . . .

I will admit I'm biased, but I do believe it would have contributed to the practical usefulness of the article had the readers been informed that commercial laboratories (in fact all testing laboratories) have available these methods of test developed through the cooperation of producers, consumers, and general-interest people. They are widely accepted because of their competence, because they are unbiased, because they are widely applicable, and because they are authoritative. ASTM standards are the basis for the purchase of millions of tons of materials throughout the world. . . .

FRED F. VAN ATTA
Assistant Secretary
American Society for
Testing Materials
Philadelphia

'Magic' for Manpower

DEAR MR. JOHNSON: As a devoted reader of CHEMICAL WEEK I know that your journal does not publish verse, but I trust that in this case you will make an exception. I hope you will receive my contribution favorably after you learn how it came into being.

Some time ago I attended a conference where the question of interesting more young students in the fields of chemistry and chemical industry was discussed. Among the many suggestions was one to introduce more "magic tricks" into the high school

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chemistry course in order to make the subject more attractive to would-be scientists. I cannot pass any opinion on this plan, but it "inspired" the verse I'm sending for your consideration.

VICTOR FOURMAN
President
Syntomatic Corp.
New York

Reader Fourman's poesy:

CHEMICALS ARE UP

When Tommy speaks of chemicals he means roll sulfur sticks,
Red phosphorus and litmus blue for doing tricks.
As Tommy now is ten and two,
He has a bag of tricks for you!
He dreams of nitrates to display explosions in the sky,
And saves his pennies every day for chemicals to buy.

Tommy now is twelve and six
But still he loves his bag of tricks:
Active sodium hissing wild on water that can "burn,"
And lactic acid, although mild, which makes blue litmus turn.
He surely does attract a crowd
When he performs his "fire-and-cloud."

Now Tom has grown so big and fit—still he's fascinated
By active chemicals that split and shares that get inflated;
Tellurium is climbing fine—
They just will have to find a mine!
Tom knows each range, each low, each high—he's master of the field,
And how to sell and how to buy and what the "drugs" will yield.

Tom now has reached just thirty-eight,
And finds that tricks are going great.
He sets aside a fund each week for chemicals to buy,
And dreams that they will reach a peak far higher than the sky.
He yearns at fifty to retire
To give his time to tricks of fire.

No Abuse Now

DEAR MR. JOHNSON: With regard to your story "Rewriting New-Drug Rules" (*May 5*) recounting proposed changes in the Food & Drug Administration, I am sure that the handling of new drug applications will be facilitated if these rules are put into effect.

With respect to the label problem

that you discuss, I am sure that there has not been general abuse of labeling arising out of changes between the preliminary and final copy. Of course, with any new drug, it must be recognized that there are progressive developments that sometimes affect labeling so that it is very important that flexibility be maintained, with due safeguards against abuses. . . .

NAME WITHHELD BY REQUEST

Freer Rein

DEAR MR. JOHNSON: [Re] . . . your article (*April 14*) "Give Traffic a Freer Rein." . . .

Our traffic committee was quite impressed by the article and felt that it would be of considerable interest to the general membership of the National Plant Food Institute. . . .

DELBERT L. RUCKER
Director of Publications
National Plant Food Institute
Washington, D.C.

SEE YOU THERE

Chemical Specialties Manufacturers' Assn., midyear meeting, Hotel Drake, Chicago, May 20-22.

National Assn. of Purchasing Agents, annual convention, Public Auditorium, Cleveland, May 20-23.

Chemical Market Research Assn., meeting on "The Chemical Industry—Review and Forecast," Biltmore Hotel, New York, May 22-23.

American Society of Mechanical Engineers-Engineering Institute of Canada, joint meeting on guided missiles, Mount Royal Hotel, Montreal, May 23-25.

Chemical Institute of Canada, 39th annual conference and exhibition, Sheraton-Mount Royal Hotel, Montreal, May 28-30.

Materials Handling Institute's Exposition, new materials handling ideas and equipment on display, Public Auditorium, Cleveland, June 5-8.

American Society of Quality Control, 10th annual meeting, Le Palais du Commerce (the Show-Mart), Montreal, June 6-8.

National Plant Food Institute, 2nd annual convention, The Greenbrier, White Sulphur Springs, W. Va., June 10-13.

Society of the Plastics Industry, Inc., 7th national plastics exposition, New Coliseum; conference and meeting, Commodore Hotel, New York, June 11-15.

American Rocket Society—American Society of Mechanical Engineers, semi-annual meeting, sessions on liquid rockets, solid rockets, ramjets, Hotel Statler, Cleveland, June 17-21.

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THE HEAT AND LIGHT STABILITY imparted by KP-90 can save you money if you are currently using expensive stabilizers for end products that require a high degree of clarity. Without sacrificing clarity or stability, the cost of your product is substantially reduced by substituting KP-90 for a portion of your present expensive stabilizer. None of the desirable properties of the plastic will be sacrificed when KP-90 is used.

A LOW TEMPERATURE FLEXIBILITY of −49°C. (Clash and Berg) makes KP-90 a desirable substitute for other more expensive low temperature plasticizers in outdoor applications. In any formulation requiring low temperature flexibility KP-90 can be substituted for the more expensive adipates, sebacates, azelates, etc. at a savings and with no loss of low temperature flexibility.

Truly the all-weather plasticizer KP-90 should be evaluated if your plastic "steps outside." It is an epoxy type primary plasticizer and is compatible with most resins.

Technical data and samples of KP-90 are available and will be sent immediately upon request.



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OHIO-APEX DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION
NITRO, WEST VIRGINIA
Department 26

☐ Send technical data. ☐ Send KP-90 sample.

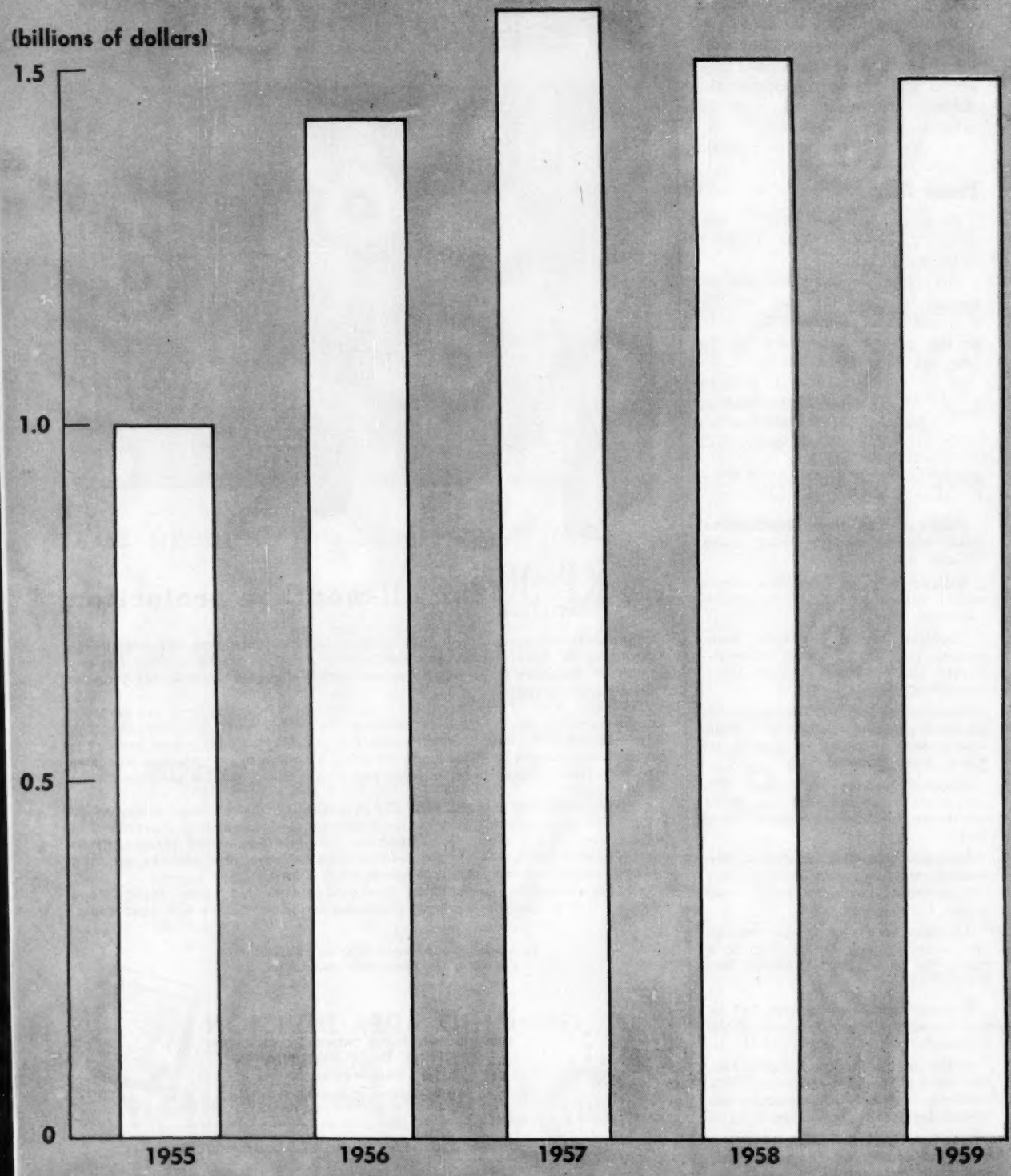
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COMPANY_____

ADDRESS_____

CITY_____ STATE_____

NEW PLANT SPENDING FOR THE CHEMICAL INDUSTRY



Sources: McGraw-Hill Dept. of Economics; 1955 figures from Commerce Dept. — SEC survey.

HOW CHEMICAL EXPANSION COMPARES WITH OTHER INDUSTRIES'

(Each industry's 1950 capacity = 100)

						Planned	
	1951	1952	1953	1954	1955	1956	1959
Aircraft, other transportation equip.	114	147	172	181	195	211	234
Chemicals, allied products	110	122	134	142	152	166	214
Nonferrous metals	114	125	137	144	154	166	212
Electrical machinery	109	123	139	150	162	177	211
Other machinery	115	129	138	143	153	167	200
Paper	104	116	124	130	139	153	194
Automobiles	111	128	132	140	151	163	192
Rubber	104	116	123	132	144	156	184
Cement, glass, clay	109	122	129	134	142	153	181
Petroleum refining	104	109	117	122	126	130	143
Food, beverages	106	110	113	117	122	128	142
All manufacturing	107	117	125	131	140	151	178

A New Record for Chemical Expansion

Chemical companies this year plan to spend more than ever before to expand capacity. The increase from '55: 41%; the amount: $1,433 million, a figure that's slightly more than the $1,428 million companies spent in '53, the previous all-time high.

And '57 should be even better. Slated for construction: $1,576 million worth of new capacity, up 10% from '56. And the expansion already planned for 1958 and 1959 will be almost as great.

These plans, reported by top executives in a survey conducted by the McGraw-Hill Dept. of Economics, show remarkable optimism, even for an industry that is as committed to growth as chemicals.

U.S. business as a whole now plans to spend almost $39 billion for new plants and equipment this year—a 30% increase over spending in 1955. This is substantially more expansion than business was planning a few months ago. A February Commerce Dept.-Securities & Exchange Commission survey, made public six weeks ago (*CW, March 24, p. 18*), estimated '56 expansion spending at slightly under $35 billion for all industry.

And for the first time since McGraw-Hill began its surveys, business spending plans for coming years are almost equal to the current year's figure.

It's impossible, of course, to say this far in advance what the actual year-to-year figures will be beyond 1956. Plans, even for this year, may be changed in the light of future developments. Too, the amounts actually spent will also be affected by future price changes, by the ability of capital goods suppliers to meet anticipated delivery schedules, and by the availability of capital.

Present capital spending plans for 1956—country wide—are so huge that there may be some difficulty in getting the materials necessary to fulfill them. But whatever is postponed until '57 will add to that year's total—and, so, reinforce the favorable prospects beyond '56.

The capital spending increases planned for '56 in such key chemical-consuming and -generating industries as nonferrous metal (123%), paper (83%), steel (82%) and automobiles (81%) point up the broad impact on the

chemical industry. And such chemical process fields as rubber (which plans a 49% boost) and cement, glass and clay (with an over-all expected increase of 42%, though cement will be up 113%) are not far behind.

The petroleum refining industries —which are supplying more and more chemical raw materials—will likely show only a 15% increase this year. But this, by any past standard, is still large.

Chemicals Excel: When you look at the already-planned hikes in capacity over the 1956-59 period, the largest are in the process industries, ranging from 18% to 29% (*see chart, p. 17*).

The chemical industry itself, at the 29% figure, tops all others. Nonferrous metals is a close second, with 28%. Paper is third, with 27%. The steel and metalworking industries, which supply equipment to these process fields, plan capacity boosts of 17-20% during the '56-'59 period. Such capital goods suppliers may this way be able to relieve some of the great pressure on their capacity, even if their sales hit new peaks in the next four years.

How Much Sales? Manufacturing Industries, generally, continue to base plans for capital expenditures on the expectation of strong growth in sales in the years ahead. Chemical makers, who see a 39% boost in sales for 1959 over '55 (*see chart, below*), again are the highest industrial group. Of course, specific plans for new capacity are made on a more conservative basis than sales forecasts, so if sales come anywhere near the goals that are being set, even more capacity than is now planned will be needed to keep up.

The capital goods industries expect some of the largest sales boosts for '56. Electrical machinery makers foresee a 15% boost; other machinery, a 13% rise. With all industries reporting plans for a 30% increase in capital spending, capital goods suppliers may not be able to deliver all the equipment their customers figure on getting. But the figures don't mean that half of industry's need for capital goods can't be met. Planned new plant expenditures, in dollars, reflect the substantial increase in costs of construction over the past year—and perhaps some anticipation of further price increases.

Research, Too: For the first time, companies were asked this year to estimate their future research and development spending (*see chart, left*). The figures for 1955, '56 and '59 spending were gathered so to be comparable to data obtained by the Bureau of Labor Statistics for the National Science Foundation (*CW, Jan. 14, p. 40*). These figures showed that nearly $5 billion was spent by all business during 1955. This, of course, includes substantial amounts of development work in such fields as electrical machinery and aircraft. Chemicals, however, ranked third behind these two categories. While the chemical industry plans a 27% increase between now and 1959, a larger growth is planned by industries that were not major spenders last year—primary metals, nonelectrical machinery, automobiles.

Total business expenditures for research and development increased 29% from 1953 to '55, are scheduled to jump another 33% by '59. But since the '59 figures are just preliminary, it's possible that the '54-'55 rate of growth may continue for most of the 1956-59 period. This could mean as much as 50% further growth in these expenditures over the next four years.

And it's the rapid pace of research-born technical advance that's the most important long-range factor in demand for new plants and equipment. These plans for new research—together with new products that are emerging from present research—may be the best explanation for industry's plans to invest more in the next four years than in any similar previous period.

HOW RESEARCH AND DEVELOPMENT SPENDING WILL INCREASE

(million dollars)

	1953*	1955	1956	1959
Chemicals, allied products	361.1	440.5	480.1	559.4
Scientific instruments	171.7	185.4	194.7	259.6
Petroleum products	145.9	170.7	184.4	201.4
Rubber products	53.6	65.9	69.2	86.3
Cement, glass, clay	38.0	46.4	54.8	65.0
Paper, allied products	27.9	36.3	41.0	49.4

*National Science Foundation.

HOW INDUSTRY SALES WILL INCREASE

(Percent increase expected in physical volume)

	1955-56	1955-59	1959*
Chemicals, allied products	9	39	15
Petroleum products	5	17	4
Rubber products	4	21	9
Cement, glass, clay	9	27	6
Paper, allied products	9	31	8

*New products, as percent of '59 sales.

Grace, Cosden Merger Moves Another Step Along the Way



COSDEN'S TOLLETT, GRACE'S GRACE: One step closer to merger.

Within the past week, both W. R. Grace and Cosden Petroleum directors moved one step closer to clinching a merger of their firms. Each board has unanimously approved the exchange of 1.025 shares of Grace for each share of Cosden.

But all hurdles are not yet scaled; Grace and Cosden shareholders must still give assent at special meetings coming up soon. And while no opposition is expected from Grace quarters, some serious objections could be forthcoming from an organized Cosden stockholder group (*CW Business Newsletter, May 5*).

What's the reason? Cosden, say the objectors, has solid growth potential that's realizable without outside help. They cite its already profitable petroleum operations, large reserves, and the profit-making potential of its new $3-million styrene monomer plant at Big Spring, Tex. (capacity: 20 million lbs./year), due to start up by December.

One Cosden dissident, Philip Green, told *CW* last week: "Cosden has substantial underground reserves, is highly respected, solvent, healthy and robust. No merger or sale is necessary."

To beat such opposition, Cosden management, under President R. L. Tollett, will have to muster the votes of two-thirds of their firm's stock to make the merger stick.

Grace management is counting on the deal. President J. Peter Grace, at last week's annual meeting, summed up both sides of the story. Cosden, he said, has several high-potential chemical projects under investigation that need the kind of financial support Grace could give. Grace looks on the Cosden addition as a logical growth of its chemical and petrochemical activities.

"Petrochemicals," Grace says, "are the heart of our newest large-scale chemical ventures. . . . If the merger with Cosden is approved we expect to gain large benefits through the pooling of Cosden's technical skill and know-how with our own."

While Cosden's chemical potential may be great, Grace does not underestimate its own future in the field. At the end of '55, the firm's net fixed assets were 55% chemical. Sales were up 10% over 1954, to $137.5 million. Earnings of the chemical group were also up despite a weak market for agricultural chemicals.

Cosden stockholders, however, are apparently not concerned with Grace earnings or dividends as such. They're probably more interested in spectacular long-term growth of Cosden stock.

As an added come-on to merger, however, Grace directors have just voted a 40¢ increase in dividends, which hikes the annual stock yield from 4.2% to 5.0%.

The big question is: Will such a move appease dissident Cosden stockholders?

Decision in Georgia

Last week, Yankees were again marching through Georgia. They reached the sea at Brunswick.

The mission: discovery of sites for chlorine/caustic plants. The result: two companies chose Brunswick locations for substantial expansions.

Olin Mathieson will follow up a $7.5-million chlorine/caustic capacity boost at McIntosh, Ala. (*CW, May 12, p. 24*), with a new producing unit at Brunswick. While it won't reveal capacity or cost figures, Olin admits to spending $1 million on pier and rail facilities alone.

Allied Chemical, which is currently building similar facilities at Brunswick, will double its previously planned capacity. Allied's total daily output should be about 200 tons of chlorine, 250 tons of caustic. Cost of the original unit, expected onstream late this year, was $12 million. The second unit, with a somewhat lower cost, should be operating by the fall of 1957.

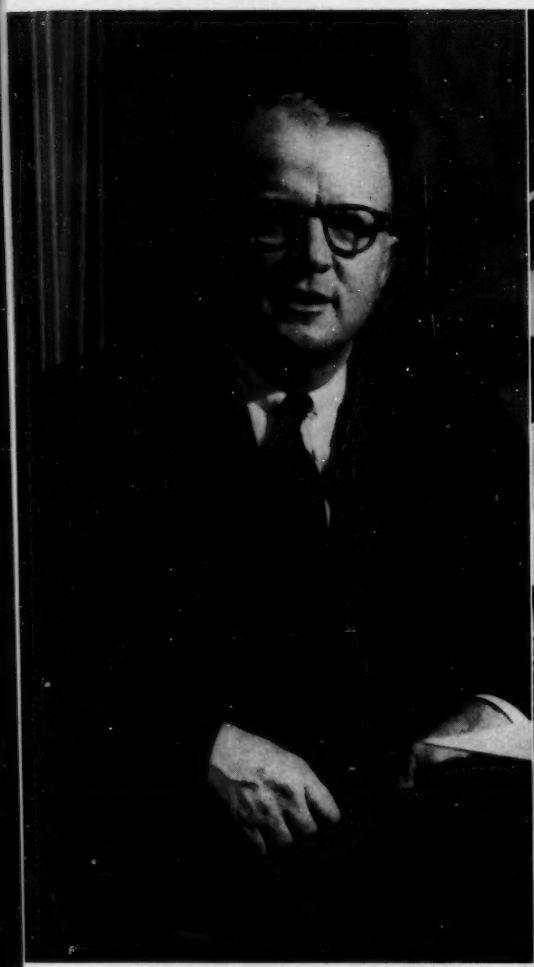
The plants will be constructed side by side on locations that front on the Turtle River. Allied's site (*CW, Feb. 18, p. 24*) totals 700 acres; Olin Mathieson's, 100 acres.

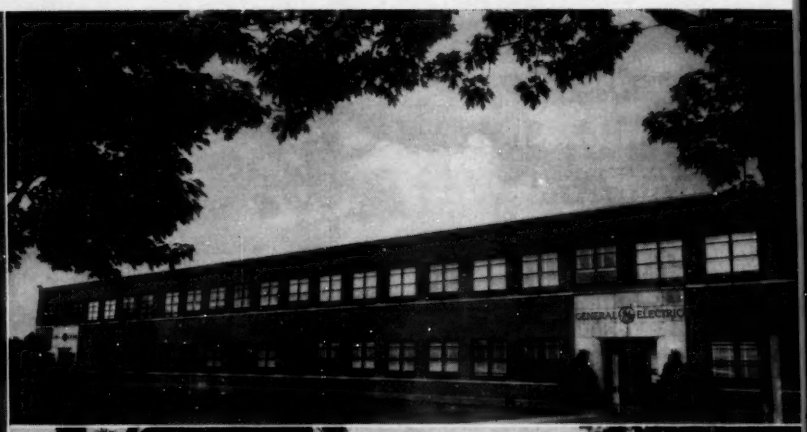
Both plants will construct pipelines to serve the nearby plant of Brunswick Pulp and Paper Co.

Principal consumer of both products, of course, is the paper industry, which is seeing a substantial development in the Southeast.

Latest Candidates: National Container has just finished building a kraft pulp and paper unit in Valdosta, Ga., but is looking for a new mill site. And Bowater Southern has several sites in mind for a new plant.

The nation's biggest paper firm has big expansion ideas, too. At last week's annual meeting, International Paper's president, Richard Doane, told stockholders that the company will spend over $100 million on expansion during 1956, and at least $70 million in '57.







GE's GIBSON: His chemical division, headquartered in Pittsfield, Mass. (upper right) provides a home for . . .

. . . chemical developments from GE's Cent

Item: General Electric buys 60 acres of land next to its Waterford, N.Y., silicone plant.

Item: GE begins production of synthetic diamonds.

Significance: In chemicals, GE is becoming a . . .

More Potent Factor

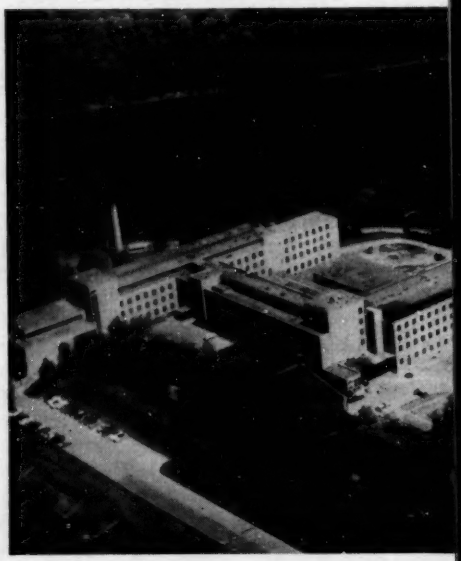
Though far from earthshaking by themselves, these bits of intelligence, revealed in the past few weeks, should trigger other-than-complacent reactions from competition-minded chemical industrialists.

The announcements indicate that General Electric's Chemical & Metallurgical Division is on its way to becoming an even-more-potent factor in the chemical industry.

How big is GE's chemical complex now? Why is the country's major electrical equipment manufacturer pushing its chemical lines? Where is it headed?

As GE's chemical arm strengthens, firms in the industry will want answers to these, and related, questions.

How Big? One of the queries that frequently stumps experts is related to GE's chemical sales. It's impossible to pin down precise figures; GE top management almost fanatically avoids divisional breakdowns of its sales figures.



Robert Gibson, who heads the division, does offer this much: "In the past decade, our yearly sales have doubled, and we anticipate a 15% boost for '56 over '55. But our first-quarter figures show an even greater rise."

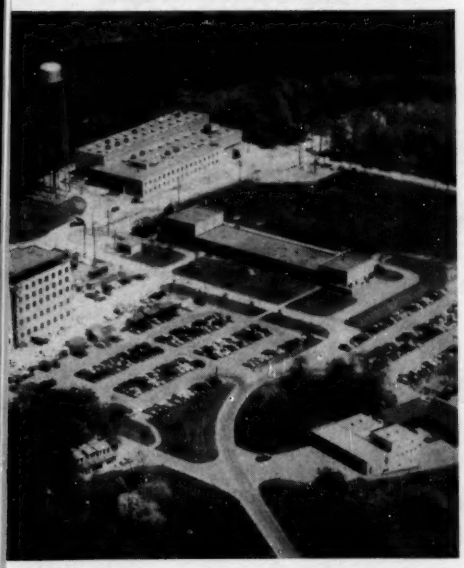
Sources outside the company have estimated the sales figure; one made last year put GE sales in the $50-100-million class. But since Gibson will admit that his sales last year were 30% above '54, it's probably safe to put the divisional sales figure in the $75-100-million range.

Whatever the figure, it would mean that chemical operations contributed about 3% of GE's $3.1-billion sales take in 1955. It means, too, that chemicals accounted for around 15% of the sales of GE's Industrial Components & Materials Group, the group that brings in roughly 20% of over-all sales.

Not Captive, Competitive: Significant, too, is the fact that GE's C&M sales are no longer largely captive, not solely directed toward satisfying the firm's voracious appetite for improved plastic parts, insulating materials.

Six years ago, 70% of the division's sales were to other divisions. Today, on the other hand, even if you exclude the Carboloy department, which has traditionally heavy external sales, more than 60% of GE chemical sales are shipped to outside consumers.

esearch Laboratory in Schenectady.



The chemical division, Gibson asserts, has two reasons for being: (1) to fill the chemical product needs of a company in the forefront of electrical, electronic and atomic energy developments; and (2) to provide a home for any chemical developments that might issue from GE laboratories —especially the company's Central Research Laboratory at Schenectady, N. Y.

Silicone Slip: As a matter of fact it's conceded in the company that GE stumbled behind a bit in the early days of silicone commercialization simply because it had no such operating division to produce or market chemicals. And that despite the fact that the company had an early foothold in silicone development.

More recent GE developments—such as irradiated polyethylene and polyester magnet-wire enamel—are faring decidedly better than silicones did in the early stages. GE laboratories researched irradiated polyethylene, then turned it over to the chemical division, which now markets the first commercial products — high-heat-resistant tapes. A similar course is likely for GE's synthetic diamonds (*see p. 144*).

As it's set up now, GE's chemical division may be regarded as a partly integrated medium-size chemical company. Management is completely decentralized from the rest of GE, with the division general manager, Gibson, and six department managers in charge. (Gibson is also a GE vice-president.) Comprising the division:

- **Silicone Products Dept.**—with a highly integrated plant at Waterford, N. Y., for producing silicone elastomers, resins, fluids, etc. Captive methyl chloride facilities are included. This plant has quadrupled its capacity since 1947 and may be expected to expand —maybe double—in the very near future.
- **Chemical Materials Dept.**—with plants at Anaheim, Calif., Coshocton, O., Pittsfield, Mass., and Schenectady for producing alkyd, polyester, and phenolic resins and compounds.

Recently (in March) a blast of undetermined origin knocked out glyptal resin production at Schenectady. But production of these products was filled in immediately by increased output at Anaheim and at Canadian GE's Petersborough, Ont., facility.

A permanent switch of glyptal resin production may be ahead, for Chemical Materials General Manager Sam Brous says the department has no immediate plans to rebuild the Schenectady facilities. Quick switchovers under emergency are one of the advantages of divisional decentralization.

- **Plastics Dept.**—with units at Decatur, Ill., Taunton, Mass., and Springfield, Mass., for producing plastic molds, molded plastic and silicone rubber parts.
- **Laminated and Insulating Products Dept.**—with installations at Coshocton and Schenectady for industrial and decorative laminates, mica products, and varnished fabrics.
- **Carboloy Dept.**—with facilities at Detroit and Edmore, Mich., for cemented carbide tools, permanent magnets, dies, vacuum-melted products, and soon—man-made diamonds.
- **Chemical Development Dept.** at Pittsfield.

"We can't overemphasize our decentralization, Gibson says. "When our division salesmen knock on GE division purchasing agents' doors, they enter with the same status as any competitive chemical company salesman."

In fact, Dow Corning (GE's primary silicone competitor) sells some silicone products to other GE divisions —and some to the chemical division itself.

While such a decentralized policy may frustrate budding GE chemical salesmen, it has two beneficial effects:

- Keeping the chemical division competitive with the rest of chemical industry.
- Snuffing out Justice Dept. monopoly thoughts, which might be caused by any exclusive dealing.

Where Now? As far as the future is concerned, look for further expansion along slightly different lines. The division—which now has 20% of its sales in finished products and custom goods—hopes to decrease the proportion.

Integration will be carried back to raw materials as far as economically possible. Emphasis will shift to manufacture, rather than formulation, of chemical products.

"We are set on building a truly commercial chemical business," Gibson reports, but one that is based solely on our own technological achievements.

Washington Angles »

» Sale of the tin smelter at Texas City may be in the cards. The House Banking Committee has okayed a bill allowing sale or lease; both the full House and the Senate will probably go along.

"Severay inquiries" about buying or renting the plant have already been received.

» A push for better trademark protection is under way. At U.S. government urging, the 14 Latin American countries that haven't yet ratified the International Copyright Convention will send delegates to the International Congress of Patent and Trademark Rights, which will convene in Washington May 28.

» Compulsory patent licensing? It shouldn't be allowed, says Patent Commissioner Robert Watson. At a closed-door briefing for chemical executives last week, Watson charged that antitrust settlements directing such licensing, "involve pouring patents down the drain. It's hard to see how they stimulate invention and research—the whole basic theory of our patent system."

» Navy paint plant shutdown moved one step closer last week. After 30 minutes of debate, the House voted to eliminate from the Defense Dept. appropriation bill the provision that keeps the department from shutting down plants without previous Congressional approval.

The Senate should concur—since the provision was originally sponsored by Democrats in the House.

EXPANSION . . . .

Oxygen: Industrial Air Products is constructing a liquid oxygen and argon plant in the Portland, Ore., area.

•

Ferroalloys: Vanadium Corp. of America will build a plant to make ferroalloys (mainly ferrochrome) near New Alexandria, O. The plant will occupy a 300-acre tract near the Ohio River. Cost of the facility: $8 million.

•

Pulp and Paper: Crown Zellerbach will install a furnace at its Camas, Wash., mill to burn waste cooking liquors from the kraft pulping process. Cost: about $2 million.

• Also at Camas, CZ's dimethyl sulfide pilot plant with a 2-million-lbs./year capacity is onstream.

• International Paper will spend $2.4 million in expanding its Baton Rouge, La., plant to boost sulfate pulp and paper output by 15%.

COMPANIES . . . .

Liquid Carbonic Corp. has completed arrangements to acquire Western Oxygen, Inc. (Seattle) on an exchange-of-stock basis.

•

American Can Co. has acquired the assets of Kienle and Co. (Huntington, N.Y.), ink and varnish manufacturer.

•

Detrex Corp. (Detroit) will purchase the outstanding capital stock of Hooker-Detrex, Inc., and is negotiating acquisition of Hooker Electrochemical's interest in Hooker-Detrex. Detrex would become sole owner of the Ashtabula, O., trichlorethylene and anhydrous hydrogen chloride plant. Hooker would get the Tacoma, Wash., plant of Hooker-Detrex.

•

Kennecott Copper Co. has formed Kennecott Titanium Corp., a subsidiary, which will take possession of a $500,000, 125-acre tract at Buffalo, N.Y. Kennecott is considering building a titanium sponge production unit there.

•

Standard Oil of California will split its stock 2 for 1 and increase authorized shares from 40 to 80 million.

•

Bowater Paper is considering several Southern sites (one near Rock Hill, S.C.) for its proposed $50-million paper mill. One obstacle for the company if it decides to build at Rock Hill: possible water pollution of the Catawba River. (*Also see p. 19.*)

•

Huss-Ontonagon Pulp & Paper Co. has purchased National Container's Ontonagon, Mich., paper mill, which it will rebuild to produce neutral sulfite chemical pulp by a new technique.

•

Texas International Sulphur Co. stockholders have approved a proposal to increase the number of authorized capital shares from 3 to 5 million.

FOREIGN . . . . .

Taxes/Britain: A new British tax proposal threatens to drive a large portion of American business out of England. The bill, intended to exempt British citizens outside the United Kingdom from British income tax payments, will make Americans and other aliens living in Britain pay tax on all their incomes. Previously they were taxed only on income actually received in England.

A vice-president of one leading American bank in England termed the bill "ruinous and fantastic." Said a spokesman for the American Chamber of Commerce: "If the bill goes through as it stands, 50% of American businessmen will probably leave." Other Americans are hoping that a discreet word from high officials will modify the proposal before it is presented to the House of Commons.

•

Pharmaceuticals/Germany: Johnson & Johnson has established a German subsidiary, Johnson & Johnson-Ethicon GmbH (Frankfurt). The firm will be J&J's agent, selling products of the parent company to German consumers, but may someday begin manufacturing operations there.

•

Ammonia/Israel: A new $4-million plant near Haifa Bay, Israel, will turn out 15,000 tons of ammonia and 45,000 tons of ammonium sulfate annually. It will be owned and operated by Fertilizers & Chemicals of Haifa, a government-controlled company. Production will go to domestic markets.

•

Pigments/Africa: British Titan Products (York, England) and African Explosives (Johannesburg) have just formed a company in South Africa to manufacture titanium dioxide pigments.

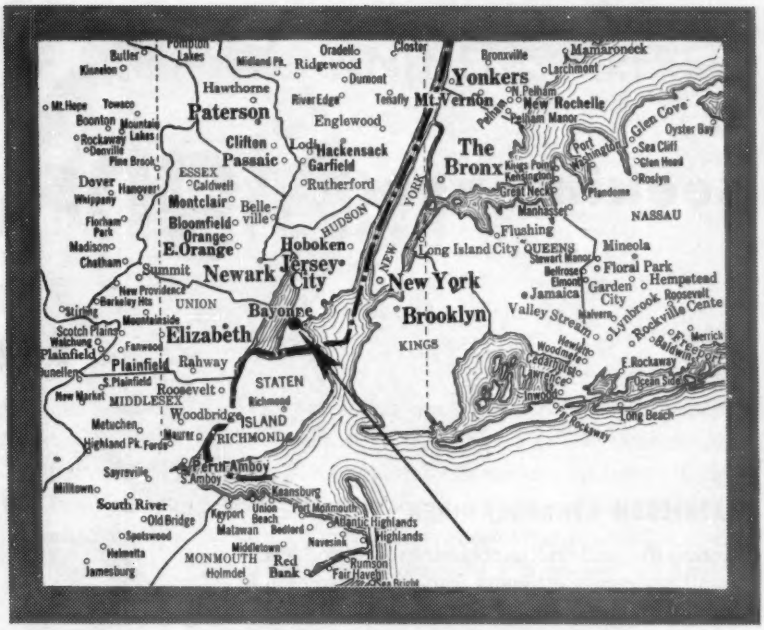
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THE SHORTAGE OF SCIENTISTS AND ENGINEERS:

How Critical Is It?

The United States is running into a serious shortage of scientists and engineers. There is no novelty in this observation. It has often been made in the last few years. And there has been mounting alarm about what this shortage may mean for both our national security and our prosperity.

There would be great novelty, however, if general agreement were attained on such important matters as the size of the shortage, the extent of the damage it threatens to inflict, and the best ways to eliminate it. The purpose of these editorials is not to provide this novelty, but to ventilate some of the key aspects of the shortage of scientists and engineers.

This first editorial in the series is designed to throw light on the over-all dimensions of the shortage. Others to follow will be addressed to such questions as:

- How serious is the threat to our economic well-being and to our national security?
- What needs to be done to prevent the shortage from becoming critical?

Rise Has Been Rapid

The problem is *not* that we have been producing a small number of engineers and scientists. Indeed, the number has risen sharply. We now have a working force of more than 600,000 engineers, over twice as many as the 286,000 there were in 1940. And we have about 250,000 scientists (chemists, physicists, biologists, geologists, mathematicians, etc.), compared to only 92,000 in 1940. About one in 148 persons in the labor force of 1940 was a scientist or engineer; today the ratio is about one in every 80.

In research and development work, where highly creative scientific minds are required, there has been fully as rapid a rise in employment of scientists and engineers. Fewer than 90,000 were employed in research and development fifteen years ago; the total now exceeds 200,000.

—But Not Rapid Enough

Despite this rapid increase in the number of scientists and engineers—at a rate much faster than the increase in the labor force as a whole—the needs of industry, government and education for technically trained people have risen even more sharply.

The principal reason for this mounting demand is the prodigious growth of research in the last 15 years. From a total of only about $900 million spent on all types of research in 1941, the annual expenditure rose to over $5 billion by 1953 (the latest estimate available). Over two-thirds of the research is done by private industry, mostly to develop new and better products and to find new and better methods of production. Most of the rest is performed by the government, largely to develop improved and inevitably more complex scientific weapons.

One aircraft company has found from its own experience that it required 17,000 engineering manhours to develop a typical fighter plane in 1940. The requirement is now about 1.4 million engineering manhours. Development of the typical fighter plane of 1960 will require well over 2 million engineering manhours.

In this dramatic example, the need for engineering services for a basic piece of military equipment soared 80 times in 15 years. It is an indication of why the demand for more and more technically trained men and women has outstripped even the imposing increase in scientific and engineering manpower of the last decade and a half.

Size of the Gap

Exactly how great the gap is between the available supply of scientists and engineers and the number required, it is impossible to say. In some instances technical talent undoubtedly could be better used than it is now. And part of the shortage might "disappear" if higher salaries had to be paid. (These questions will be discussed in later editorials.) But informed estimates of the approximate size of the gap can be given.

- According to the best available information, from estimates by the Engineers' Joint Council and the U. S. Bureau of Labor Statistics, **the minimum need for engineers from graduating classes is 40,000 each year for the next ten years.** Last year we graduated only 23,000 engineers, just about enough to cover replacement needs without allowing for any expansion of the number of active engineers. Projections made by the U. S. Office of Education indicate that we shall probably not have a class of 40,000—the *current* annual requirement —until 1963.
- According to Dr. Howard Meyerhoff, executive director of the Scientific Manpower Commission, **there is now a shortage of about 20,000 scientists.** Last year the number of doctoral degrees in the natural sciences, almost a prerequisite for research work, was only 5,000. Dr. Meyerhoff estimates that the shortage of scientists will rise another 30,000 by 1960.

More Needed As Teachers

Not all of the graduates with scientific and engineering training, furthermore, will work as scientists and engineers—that is, by performing research and giving it practical application. Such training is now necessary in many sales and management positions. And more of our technically trained men and women must remain in educational institutions as teachers if the quality of engineering and scientific education is to be maintained. A survey in 1954-55 by the National Education Association showed that, out of 277 universities, state colleges and large private colleges, nearly one-third *already* had unfilled vacancies in engineering and three-fourths had vacancies in physical sciences.

The dimensions of the shortage of scientists and engineers can be summarized as follows: **Despite a substantial rise in the trained manpower available, the needs of industry, the government and education have risen still faster. The best information indicates that, on the basis of current and anticipated needs, our recent yearly rates of production of slightly over 20,000 engineers and about 5,000 PhD's in natural sciences could be doubled without closing the gap entirely.**

The disturbing implications of this shortage for our national security and our prosperity and some practical suggestions for eliminating it will be the subjects of subsequent editorials in this series.

This is one of a series of editorials prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments of particular concern to the business and professional community served by our industrial and technical publications.

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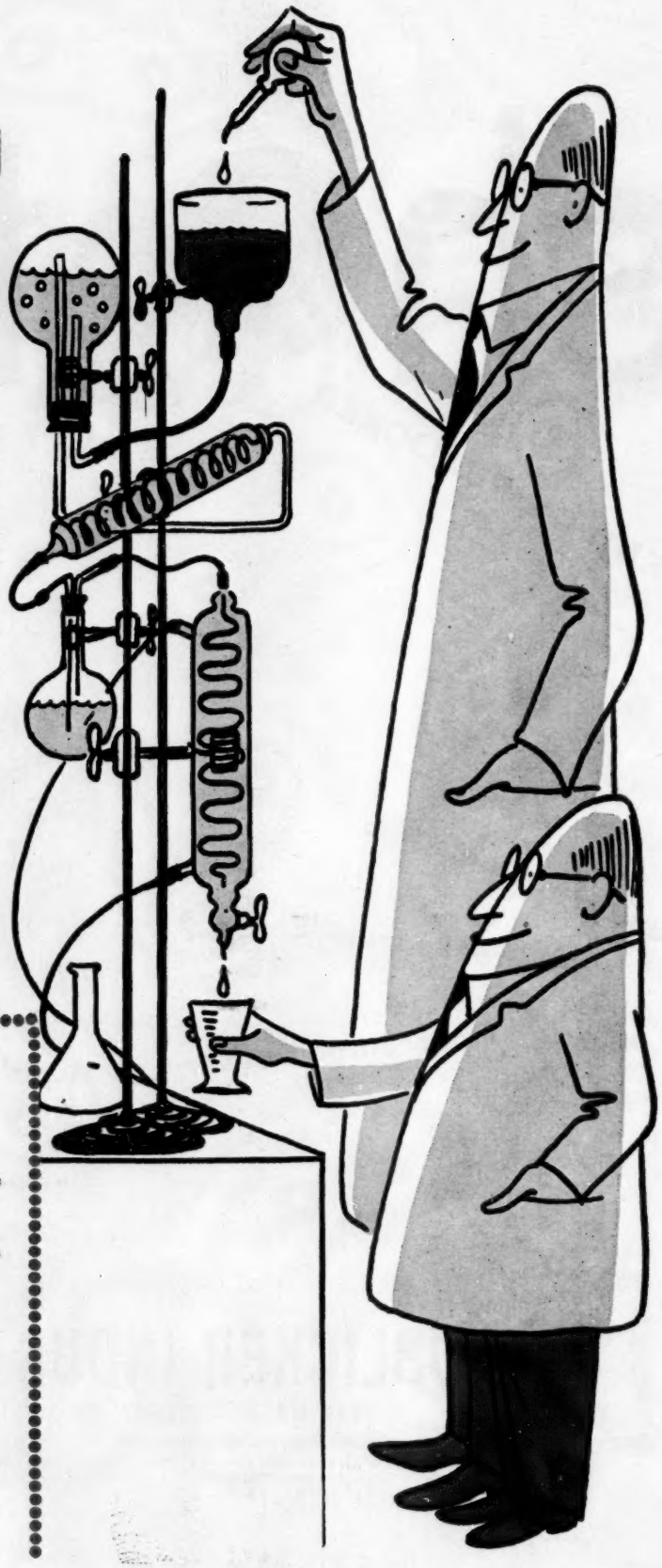
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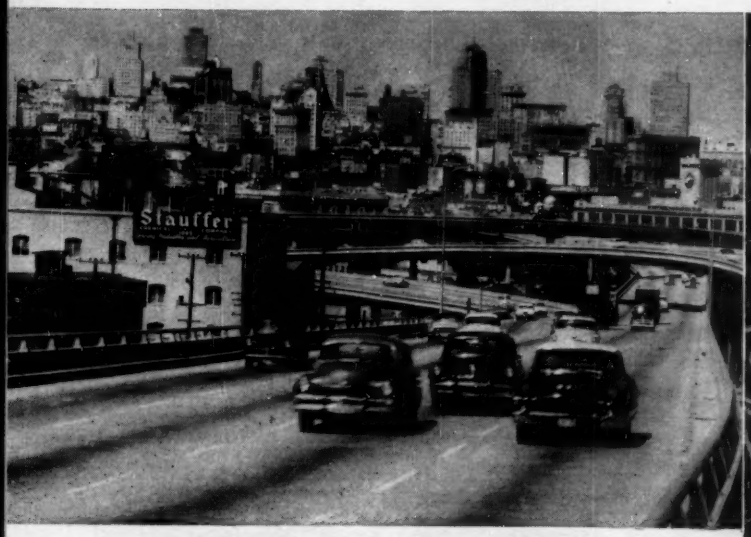
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BAYSIDE PRODUCERS†: Serving Pacific Coast's agriculture, industry, builders and consumers, nearly 150 process companies make San Francisco and its peninsula . . .

Chemical Capital of the Golden West

Big banks and mass markets are prime attractions for the 108 chemical companies maintaining headquarters or branch offices in San Francisco and southward along the bay to San Jose.

Process plants there, backed by resourceful researchers, are taking a lively part in the area's current growth and prosperity. But over-all, business, not production, is in the saddle at the City of Bridges.

THESE DAYS, production tags along behind sales and research programs in the chemical industry on the San Francisco peninsula.

As of this week, there's no large, strictly chemical expansion project scheduled for the 55-mile peninsula from San Jose to San Francisco. The 34 principal chemical plants there certainly aren't being cut back, but they're not so prominent now as the 13 home offices, 95 branch offices, and various big research and financial organizations that make this area the chemical industry capital of the West.*

Always a big trade and commerce center, San Francisco—which late last week was host to a delegation of Japanese chemical company executives—is aggressively retrieving the front-rank position it held in Pacific Ocean shipping prior to the 1949 ban on shipments to China. The free-trade zone established here right after World War II has been a bustling success; and on May 27, the city will open a $2-million World Trade Center as a further stimulus and catalyst to a rising flow of goods of all kinds.

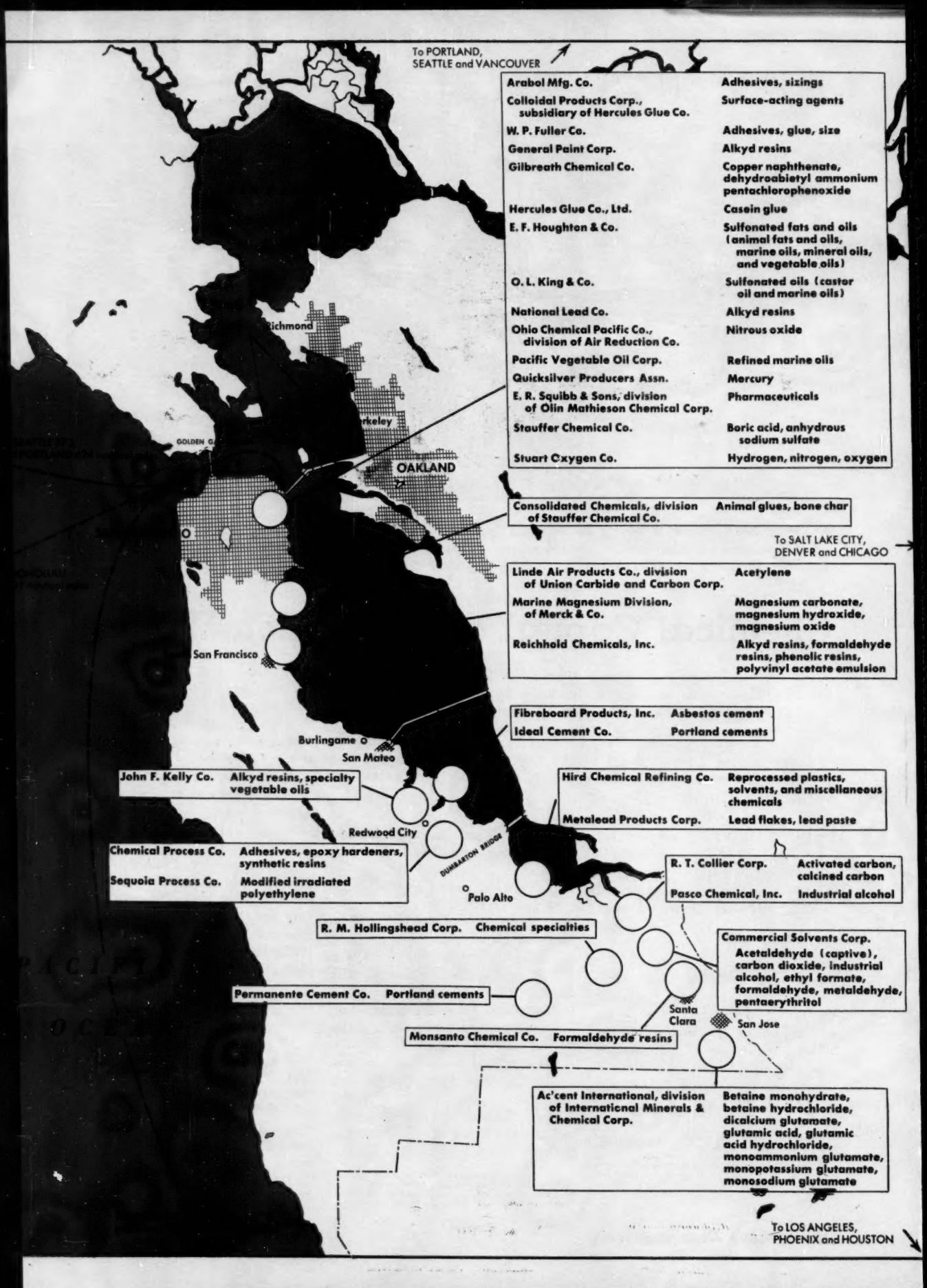
Fiscal, Mental Assets: One thing that makes San Francisco a strategic spot for growth company headquarters is its wealth of banking houses. Known as "the Wall Street of the West," the city's skyscraper-studded financial district is home base for 13 banking institutions whose assets total more than $21 billion. Chief among these: the 52-year-old Bank of America, world's largest bank, with 575 branches and nearly $10 billion in resources.

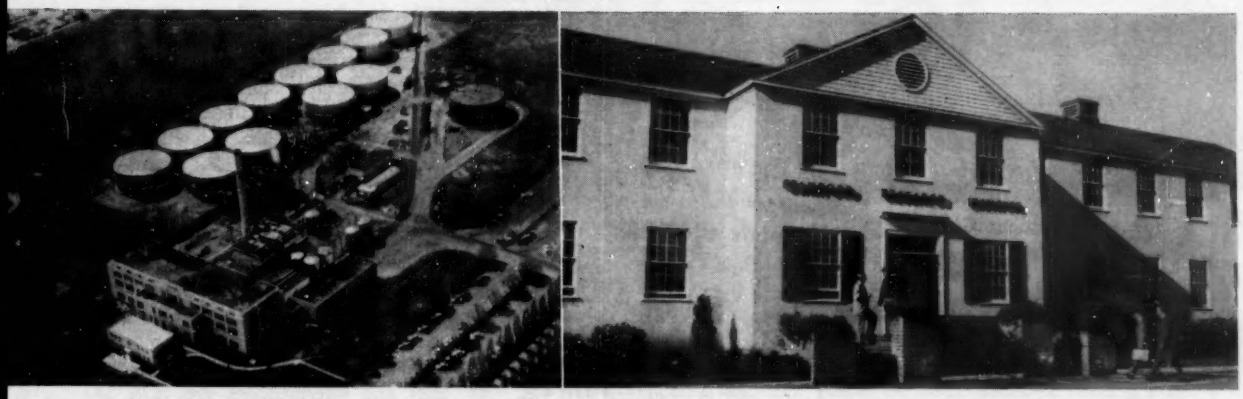
Another key to San Francisco's drawing power for management is a wealth of research organizations. Largest is Stanford Research Institute, which in nine years has grown to a $10-million business, with 1,200 employees, and regional offices in Los Angeles, Washington, Phoenix, Portland and Honolulu. Projects in SRI labs have been instrumental in making profits for numerous bay area companies; for example, Sequoia Process Corp., which developed its modified irradiated polyethylene (*CW, May 5, p. 46*) in cooperation with SRI.

Then there are the San Francisco branch and laboratory of Arthur D. Little, Inc.; Stauffer Chemical's Mountain View Agricultural Research Laboratory; the Cooperative Research Foundation that was formed to strengthen working relationships between engineers and scientists; and all the research facilities at the peninsula's six leading colleges: University of

*However, production facilities are being expanded at other spots in the San Francisco Bay area—notably in the East Bay region (Calspray's nitrogen fertilizer complex and Oronite's isophthalic acid plant, both at Richmond) and along the Sacramento River (Du Pont's Antioch works for tetraethyl lead, Freon and chlorinated hydrocarbons).

†Left, San Francisco skyline is backdrop for Stauffer Chemical plant; right, Santa Clara hills are setting for Permanente Cement plant, largest in the West.


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Colloidal Products Corp., subsidiary of Hercules Glue Co. — Surface-acting agents
W. P. Fuller Co. — Adhesives, glue, size
General Paint Corp. — Alkyd resins
Gilbreath Chemical Co. — Copper naphthenate, dehydroabietyl ammonium pentachlorophenoxide
Hercules Glue Co., Ltd. — Casein glue
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O. L. King & Co. — Sulfonated oils (castor oil and marine oils)
National Lead Co. — Alkyd resins
Ohio Chemical Pacific Co., division of Air Reduction Co. — Nitrous oxide
Pacific Vegetable Oil Corp. — Refined marine oils
Quicksilver Producers Assn. — Mercury
E. R. Squibb & Sons, division of Olin Mathieson Chemical Corp. — Pharmaceuticals
Stauffer Chemical Co. — Boric acid, anhydrous sodium sulfate
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Consolidated Chemicals, division of Stauffer Chemical Co. — Animal glues, bone char
To SALT LAKE CITY, DENVER and CHICAGO
Linde Air Products Co., division of Union Carbide and Carbon Corp. — Acetylene
Marine Magnesium Division, of Merck & Co. — Magnesium carbonate, magnesium hydroxide, magnesium oxide
Reichhold Chemicals, Inc. — Alkyd resins, formaldehyde resins, phenolic resins, polyvinyl acetate emulsion
San Francisco
Fibreboard Products, Inc. — Asbestos cement
Ideal Cement Co. — Portland cements
Burlingame
San Mateo
John F. Kelly Co. — Alkyd resins, specialty vegetable oils
Hird Chemical Refining Co. — Reprocessed plastics, solvents, and miscellaneous chemicals
Metalead Products Corp. — Lead flakes, lead paste
Redwood City
DUMBARTON BRIDGE
Chemical Process Co. — Adhesives, epoxy hardeners, synthetic resins
Sequoia Process Co. — Modified irradiated polyethylene
R. T. Collier Corp. — Activated carbon, calcined carbon
Pasco Chemical, Inc. — Industrial alcohol
Palo Alto
R. M. Hollingshead Corp. — Chemical specialties
Commercial Solvents Corp. — Acetaldehyde (captive), carbon dioxide, industrial alcohol, ethyl formate, formaldehyde, metaldehyde, pentaerythritol
Permanente Cement Co. — Portland cements
Santa Clara
San Jose
Monsanto Chemical Co. — Formaldehyde resins
Ac'cent International, division of International Minerals & Chemical Corp. — Betaine monohydrate, betaine hydrochloride, dicalcium glutamate, glutamic acid, glutamic acid hydrochloride, monoammonium glutamate, monopotassium glutamate, monosodium glutamate
To LOS ANGELES, PHOENIX and HOUSTON



SALTS AND SAVANTS: At San Jose, IMCC's plant for glutamates; at Menlo Park, SRI headquarters.



LEEWARD OF HILLS: At Sunnyvale, R. M. Hollingshead (specialties); at Redwood City, Chempro (resins).

California (San Francisco campus), University of San Francisco, San Francisco State College, Stanford University, University of Santa Clara and San Jose State College.

No Drag on Sales: All this emphasis on research and financing doesn't mean that the process plants on the San Francisco peninsula are so much dead weight to their companies. They've been humming since 1859, when the area's first cement plant began making hydraulic cement from shell marl (sea shells in a matrix of calcite and clay). And with the local population climbing at about 7%/year and with last year's 10% rise in San Francisco retail sales attesting to lively business conditions, the sales future seems lustrous.

Near Los Altos, Permanente Cement—one of the Henry Kaiser companies—is planning to start up a sixth kiln next month at its 7-million-bbls./year plant, which is already rated as one of the world's two largest.

The other big cement producer in the area—Ideal Cement, with a multimillion-barrel plant at Redwood City—uses the bay's huge beds of oyster shells as its sole source of lime. This is an instance of how San Francisco Bay provides a major portion of the raw materials used by the chemical industry on the peninsula.

Brine and Bitterns: Another example of bay-based industry is the $14-million Leslie Salt Co., which some years ago consolidated most of the bay area's solar-evaporation salt plants, one of which had been in continuous operation near the south end of the bay since 1862. Leslie, with offices in San Francisco, now accounts for more than 80% of all salt produced in California, ships about 450,000 tons/year (45% of its total) directly to chemical process industries. Most of this material is shipped by water through the Port of Redwood City.

A third industry based on bay waters is that of recovering magnesia and related compounds. In 1880, a plant was built to carbonate bittern (waste liquor from salt production) to make a dynamite absorbent; and from time to time, potash, magnesium sulfate and magnesium chloride were produced by bay area salt companies through fractional crystallization. But these activities all petered out.

Then in 1927, Marine Chemical Co. built the first U.S. plant to recover magnesium compounds directly from sea water. Initial capacity of the South San Francisco plant was 1,000 lbs./day of magnesium carbonate. That company—which has become the Marine Magnesium Products Corp., owned by Merck & Co.—now makes relatively small quantities of high-priced magnesia products, such as milk of magnesia. Originally, the hydroxide was precipitated with calcined oyster shells, but now calcined dolomite is used.

First in Dynamite: In 1868, with pioneer Westerners creating big new markets for explosives in mining and con-

THEY CALL IT HOME

(Companies with nationwide chemical process operations that maintain their main offices on the San Francisco peninsula)

Chemical Process Co. (Redwood City)
Crown Zellerbach Corp.
Fibreboard Paper Products, Inc.
Food Machinery & Chemical Corp. (San Jose)
Foremost Food & Chemical Co.
W. P. Fuller & Co.
General Paint Co.
Honolulu Oil Corp.
Leslie Salt Co.
Pacific Vegetable Oil Corp.
Pope & Talbot, Inc.
Standard Oil Co. of Calif.
Tidewater Associated Oil Co.

struction, the first dynamite plant in the U.S. was built in what is now San Francisco's Sunset District. A year earlier, the San Francisco Chemical Works had been established in the city's Mission District to produce nitric and sulfuric acids.

Stauffer Chemical was founded in San Francisco in 1885 to make sodium carbonate and sulfur. But though about half of its production is still in the West, Stauffer has moved its executive offices to New York.

Shell Chemical, too, was "born" in San Francisco but now holds forth in New York. Shell got a big boost in the early 1930s when it developed anhydrous ammonia for California's San Joaquin Valley ranches.

Others Stay Put: Oronite Chemical, however, with a large manufacturing operation across the Bay in nearby Richmond, conducts its business from offices in the heart of San Francisco's financial district. It's parent company —Standard Oil Co. of California— has two other chemical subsidiaries that also headquarter in the bay area, California Spray-Chemical in Richmond and American Bitumuls & Asphalt in San Francisco.

Chemical Process Co. also started in San Francisco—in 1938. Now it's well down the peninsula at Redwood City.

Most of the locality's chemical plants, as well as most of its population, are along the eastern side of the peninsula, close to the bay. On that side, they're sheltered from the fog and sea breezes by the Skyline Range of hills (up to 2,800-ft. elevation) that just about divide the peninsula in two along the ill-famed San Andreas fault. (It was a slippage along this fault in 1906 that caused the earthquake that in turn started the fire that virtually destroyed the city.)

Highest Average Income: San Francisco is a wealthy city, having what appears to be the highest per capita income of any large U.S. city. It is also a principal communications and transportation center. It has a $60-million international airport south of the city, and the $14-million air terminal building there—opened less than two years ago—is already overcrowded. An $8-million expansion plan—which San Francisco boosters assert would give their city the world's first "jet age airport"—is in the works.

But shipping, of course, is of far greater importance to industry. San Francisco—on one of the world's great natural harbors and served by 112 steamship lines—has frequent sailings to and from all major Pacific ports. Chemicals and allied products accounted for about $27 million out of the $403.7 million worth of total exports through the Golden Gate in 1954. In addition, outbound ships carried more than $25 million worth of nonmetallic minerals, many of which were chemical products.

There's still room for more chemical producers on the San Francisco peninsula. A number of bayside industrial sites are available between San Francisco and San Jose; there's plenty of good process water; electric power and natural gas—both furnished by Pacific Gas & Electric, one of the world's largest privately owned utilities—are available in large amounts and at relatively low cost*; raw materials and intermediates are close at hand; and the three-state Pacific Coast market is growing faster than any other section of the country. Also, San Francisco is ideally situated to tap the Intermountain, Pacific Northwest, and Oriental markets.

The host of chemical building blocks being produced within 100 miles of the city range from acetic acid to xylenes (*see map, p. 32*) and includes all major heavy industrial chemicals, most industrial gases, a long list of organics based on petroleum and natural gas, and numerous derivatives of animal and vegetable products. In addition, San Francisco is the focal point of a big mining area that turns out many metallic and nonmetallic ores—among them barite, cinnabar, lignite and quartz.

As of now, the area's chemical productive capacity seems to be somewhat limited. However, there's no telling how much expansion will come later from interaction of the peninsula's potent research, financial and managerial resources.

*On industrial contracts, power above and beyond 42% of load factor costs 6 mills (minus possible 4% discount) if service is taken at primary voltage. Natural gas rates range down to a low of 30¢/1,000 cu. ft. (1,100 Btu.).

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National Lead Co.

*San Francisco plant destroyed by fire in 1955; new plant and office to be built "south of San Francisco" for early 1957 occupancy.



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Typical tests of current production		TYPICAL TESTS
META-XYLENE	Meta-Xylene, % (wt.)	95.1
	Boiling Range, °C (start to dry)	1.0
	Specific Gravity, 60°/60°F	0.869
	Color, Saybolt	+30
	Sulfur Compounds, as H_2S or SO_2	None
	Paraffins, %	0
PARA-XYLENE	Para-Xylene, % (wt.)	95.4
	Boiling Range, °C (start to dry)	1.0
	Specific Gravity, 60°/60°F	0.865
	Color, Saybolt	+30
	Sulfur Compounds, as H_2S or SO_2	None
	Paraffins, %	0.20
ORTHO-XYLENE	Ortho-Xylene, % (wt.)	86.3
	Boiling Range, °C (start to dry)	1.2
	Specific Gravity, 60°/60°F	0.875
	Color, Saybolt	+21
	Sulfur Compounds, as H_2S or SO_2	None
	Paraffins, %	8.0

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3001

Airco's Credo: Production



AIRCO'S HILL: To make any business grow, you've got to dare to do.



GUNTHER: On polyvinyl alcohols, no let-up in research.



MCFARLIN: 'With new vinyl acetate plant, we've raised a horse to ride.'

To Air Reduction management, the ample first-quarter net income gain of 72% over '55's first quarter, reported to stockholders last fortnight, is no surprise. Rather, it's the happy culmination of nearly eight years of careful risk-taking and a firm belief in long-range prosperity.

President John Hill, who's been setting Airco's course since 1948, claims no credit for forecasting banner business in 1955 (when earnings went up 82.5%) or 1956, points instead to thorough company streamlining to take advantage of rising business. "As I see it," he remarks, "the whole point of Air Reduction's success in 1955, and now, is that we were ready for it."

Getting Ready: Before World War II, Airco was making money easily with little or no need for risk-taking; the war years were spent getting out production to meet defense needs. In 1945, however, as emergency demands faded away, the company found itself badly in need of new goals and new organization to meet the booming competition of postwar business.

Upshot was that in 1948, Airco took on a new philosophy, which, Hill told stockholders, boiled down mainly to the theme "Production shall push sales." To meet this goal, management took bold steps, starting with rehabilitation of its then-going businesses. Since that time Airco has:

- Merged or dissolved its subsidiaries into 10 operating divisions.
- Spent $90 million for expansion, principally for oxygen plants at Butler, Pa., and Riverton, N. J., and the Calvert City, Ky., complex for calcium carbide and acetylene.
- Initiated an exploratory chemical division and acquired Colton Chemical Co. (Cleveland) in exchange for 113,925 shares of common stock.
- Planned a $16-million expansion program for 1956, mostly in industrial gases.

"Now," says Hill, "we're feeling the benefits. We went through some lean years getting ready to take advantage of the business uptrend; we won't look as good in bad times as we used to—but we'll look a lot better in good times." Backing up his risk-taking philosophy, Hill points to the history of U.S. gross national product over the past 20 years, down only four times, otherwise always up. By 1965, he figures, GNP will be $500 billion.

How It's Split: Of Airco's $149-million sales in '55, 53.5% were in industrial gases and metal-working equipment. But another healthy chunk was contributed by calcium carbide and acetylene production for chemical process use—20% of the sales income as compared with '54's 16.5%. (Largest dip in relative share of sales income came in industrial gases.)

Biggest development thus far in the company's chemical line is the start-up of its 30-million-lbs./year vinyl acetate monomer plant at Calvert City. Says Vice-President Jack Gunther, whose responsibilities lie mainly in shepherding Airco's chemical ventures: "This is our first real move into the internal development of a chemical line. Basically, we feel our best path of research is in monomer materials derived from acetylene." Production started in February with acetylene piped down from the National Carbide division's huge four-furnace calcium carbide plant nearby.

A Horse to Ride: Chemical division President C. J. McFarlin looks on this initial enterprise as the first horse in Airco's chemical stable: "We bought Colton, a strong consumer of vinyl acetate, to give us a start in producing exploratory chemicals for market evaluation. Most companies seem to be buying ready-made industries as a horse to ride; we've had to raise the horse."

Airco's expanded chemical ventures brought in around $30 million in sales in '55, but the company's looking to a greater share in the market this year, expects to make some announcements this summer of new products developed through its own research projects. Likely offering: alcohol and glycol intermediates to go into pharmaceuticals, perfumes, surfactants.

In paints, Airco feels it has made some big advances since last year with a number of improved emulsion products. Pointing to what they call the poor exterior qualities of styrene-butadiene base paints, McFarlin and Gunther claim decided gains for their new copolymer emulsions in both exterior and interior application. Already 30 colors of Airco-based paints

Pushes Sales

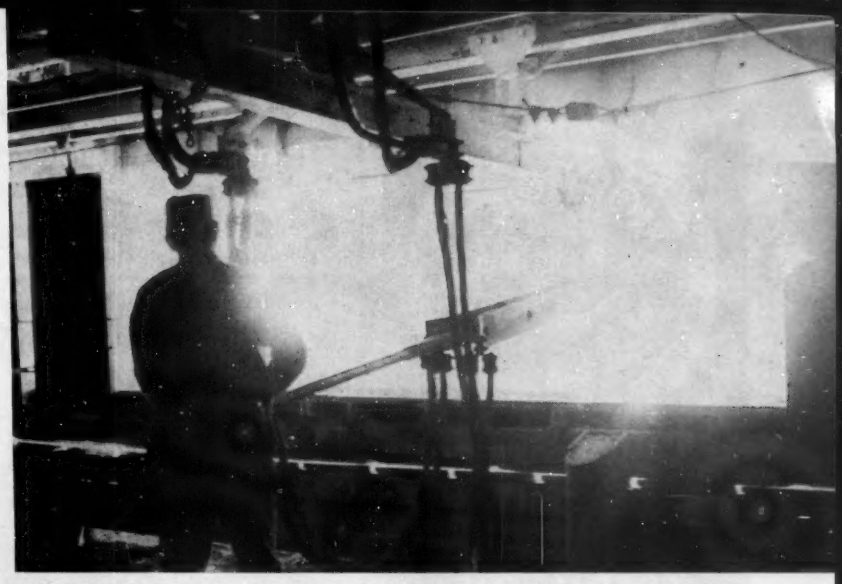
are being used in Socony-Mobil's new New York building where Airco will move its offices this summer. The paints are water-based and odorless, have proved almost indestructible, according to Gunther.

Growth From Within: In its research activities, Airco has allotted more than three-fourths of the space at its Murray Hill, N. J., laboratories to chemical development, has budgeted over $1.5 million to the chemical staff. A big project has been extensive work in the field of polyvinyl alcohol uses, but, according to Hill, "nothing has come of it yet." Adds Gunther, "It certainly can't be called a short-term project," but Airco will continue to push this work.

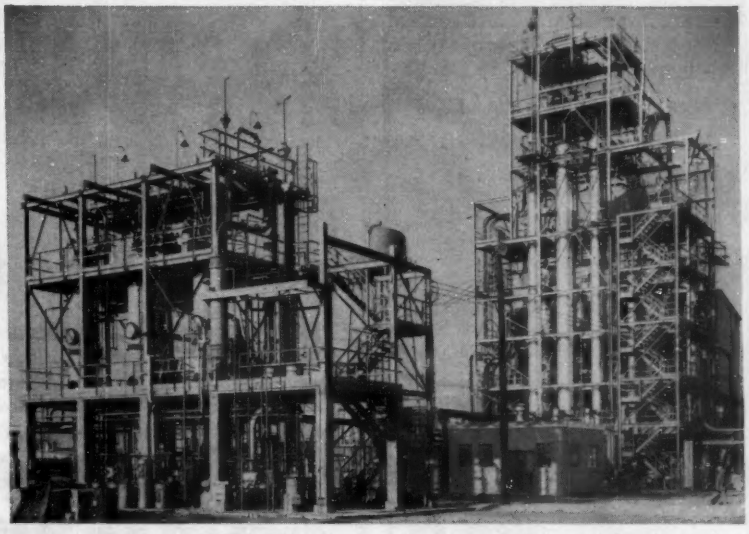
To critics of its research program generally, management points out it was only in 1951 that real building of the program started. "Until then," Airco executives say, "our research was mostly a service to the going business. Now, we've got to expand Murray Hill to keep up with our ideas." General feeling is that this early in the game present commercial development is fully consistent with sales and production.

Whereto Now? In its own view, Airco management attributes its growing stature to keeping salesmen moving to get rid of production. And to prove its point, the company looks back on its big venture in calcium carbide at Calvert City. When the company asked its directors for $10 million in 1951 to build two furnaces, there wasn't a customer in sight. But before the original installation was completed, still another $8 million was appropriated to double the capacity. And, says Hill, in 1955 it demonstrated its full worth. Last year, Airco produced some 550,000 tons of calcium carbide, more than 40% of total American production.

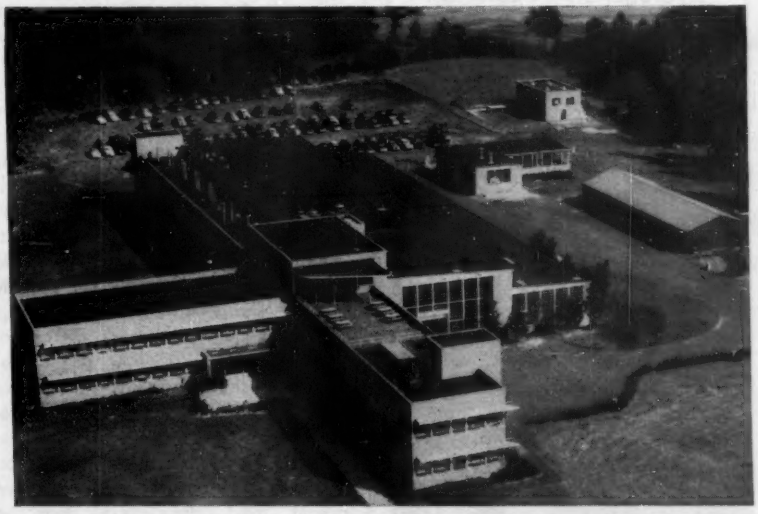
For the future, Hill says, Airco will continue to plan on prosperity. For instance, the $16-million expansion program for this year will be financed entirely from within. But after that, says Hill, "any substantial new project will probably have to be financed from the outside. We realize we're taking risks, but no business of any worth can afford not to. I guess you might say we've got to dare to do."



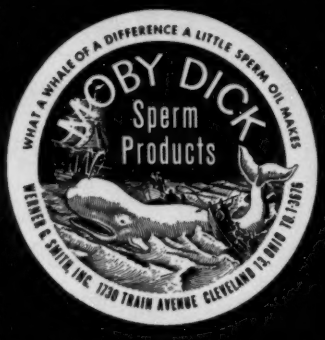
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HOW BRITAIN BOOSTS SCIENTIFIC EDUCATION

These 3 plans . . .	Sponsored by . . .	Call for spending of . . .	For these goals . . .
• **Industrial Fund**	90 British industries, including 12 chemical companies	$9,800,000 over an unstated period of time (no annual limit)	To improve scientific education facilities on what corresponds to U.S. high-school level
• **ICI Transfer Scholarship Fund**	Imperial Chemical Industries, Ltd.	$106,400 each year for three years, or roughly $2,128 each for up to 50 scholarships a year	To aid college students in transferring from liberal arts into science courses; plan is expected to result in increase of 40-50 scientists and technologists for Britain each year
• **British Government's 5-Year Plan**	The British government	$271,000,000 over the next five years, with $47 million going for equipment and the remainder for new buildings	To increase from 9,500 to 15,000 the number of advanced students in technical colleges, and to increase number of part-time trainees

Britain Bids for Talent

In a determined bid to boost the relatively skimpy output of Britain's scientific education, British government and industry are backing three separate plans to increase the country's technological manpower and to improve facilities for scientific instruction.

Moved to action by the fact that Britain produces only 57 graduate engineers for each million of population, compared with 280 for Russia, 136 for the U.S., 86 for Western Germany, and 82 for Switzerland, industry and government in the United Kingdom have introduced plans to improve scientific education on the secondary, college, and graduate levels.

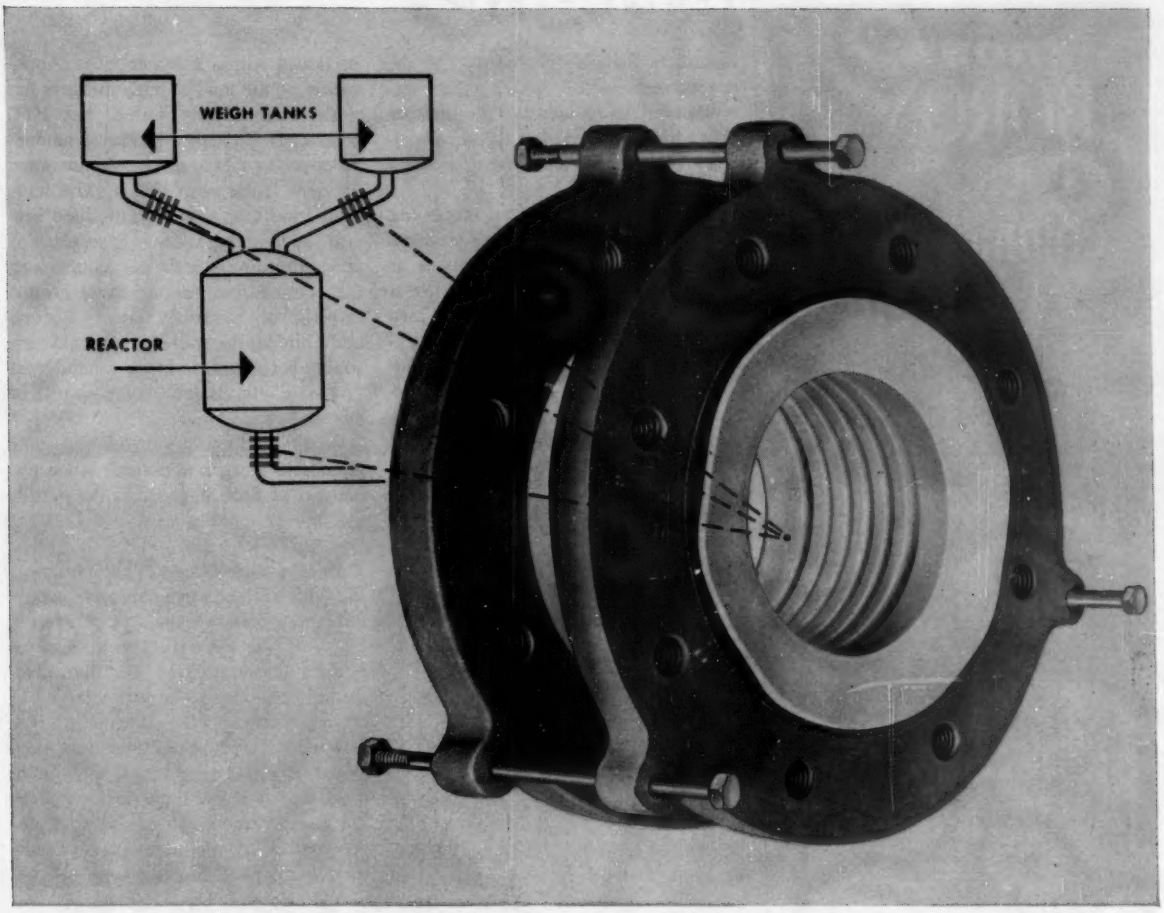
One, the Industrial Fund, is supported by subscriptions from 90 British companies—including 12 chemical firms—and was organized to provide capital grants toward the building, expansion and equipping of school science laboratories. A 125% increase since the 1930's in number of boys enrolled in precollege mathematics and science has created a pressing need for more laboratory facilities. The need for facilities is much more urgent, fund officials say, than the need for qualified teachers.

Present goal of the fund is $9.8 million, of which $8.1 million has already been subscribed.

Aid for Switchovers: Purpose of Imperial Chemical Industries' Transfer Scholarship Fund is to induce liberal arts students to transfer into the sciences. This fund will give up to 50 students each year an opportunity to shelve liberal arts studies and enroll in one of several designated universities for a one-year preliminary course in science—at the expense of the Transfer Scholarship Fund. At the end of one year, the student will be qualified to proceed toward an honors degree in science. This plan is expected to cost ICI roughly $2,128 per student.

Five-Year Government Plan: Another, and most recent, of the British aid-to-scientific-education plans is supported by the government. The government has announced that it plans to spend $224 million on new technical college buildings and equipment in England, Scotland and Wales. Building expenditures under this plan are expected to reach $25 million for 1956-57, increasing to $42 million for each of the following two years.

Purpose of this plan, called "funda-



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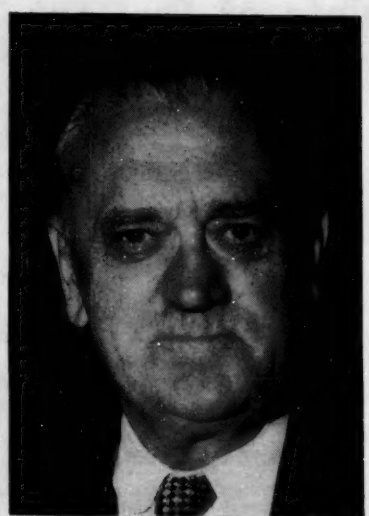
mental to Britain's prosperity" by the government white paper that announced it, is to increase the number of advanced students in technical colleges from 9,500 to 15,000 "as soon as possible."

The plan also calls for increasing by about 50% the number of students graduated from advanced courses at technical colleges, and for getting a greater number of employees into part-time academic training. The part-time training phase of the plan, the government explains, is necessary to properly support at lower levels the increasing number of scientists and engineers the program is expected to produce.

England's Minister of Education David Eccles summarized the new-found spirit toward aid to scientific education when, speaking of the Five-Year Plan before the House of Commons, he said, "This program will be exempt from cuts, delays and postponements."

LEGAL

Conglomerate Mergers: Broadening of U.S. antitrust laws to cover so-called conglomerate mergers—those instances in which companies buy firms engaged in wholly different lines of business—is due to be tested soon. The Federal Trade Commission is currently preparing two cases for action and formal complaints will probably be issued within a few months. Application of the laws to such mergers has never been legally tested, but FTC feels the 1950 Celler-Kefauver amendment to the Clayton Act was intended to cover such activities. FTC Chairman John Gwynne recently cited several such mergers as examples of concentrations which are concerning the commission. Among those groups directly or indirectly cited: Borden and Olin Mathieson. Key to legal reasoning is the phrase in the amendment "substantially lessen competition in any line of commerce." But proof of lessened competition through a conglomerate merger is difficult since the number of firms engaged in the particular line is not decreased.



WIDE WORLD

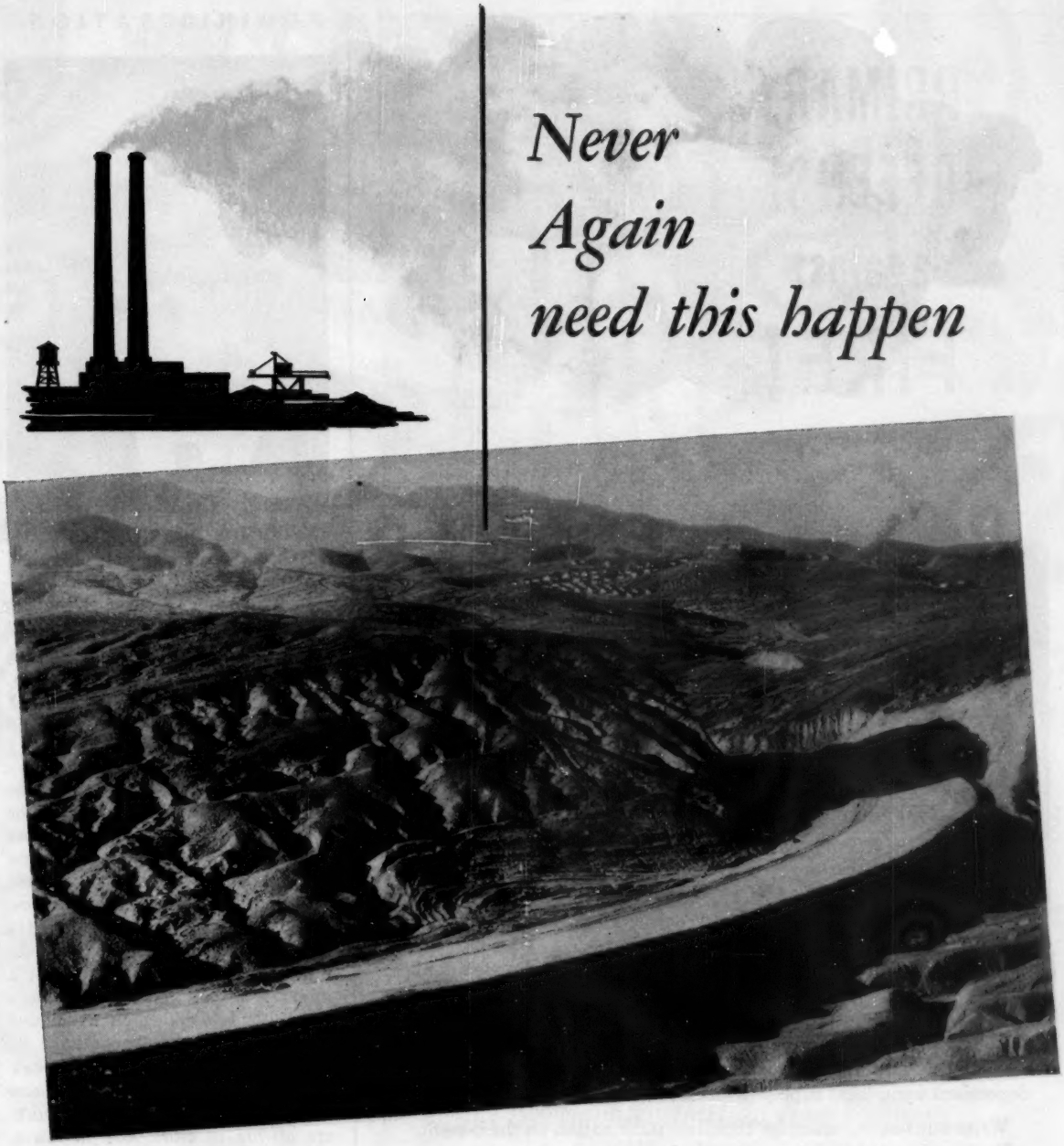
FTC'S GWYNNE: Do 'conglomerate mergers' lessen competition?

•

Zoning and Odors: That pollution and odor problems can cause expansion difficulties is shown again (*CW, March 24, p. 36*) in the efforts of a Chicago plastics fabricator to be permitted zoning variations so he can enlarge his factory. Arthur Weiss, owner of the company, has promised the city zoning board that he'll take action to combat noise and odors. At hearings held by the board, a neighbor of Weiss' testified that the operation makes considerable noise, "blows odors directly into my house." The witness spoke for 75 neighbors who raised a petition against the rezoning. The Weiss company's previous owners had said that the operation would be noiseless and odorless. The board, in 1946, allowed 24-hour operation for the factory under its previous ownership, but had ordered that it should be odorless and noiseless. Weiss's request has been taken under advisement.

LABOR

In-Plant Unionizing: A company doesn't have to allow labor union organizers to hand out recruiting pamphlets to employees on the plant property, providing that the union has other opportunities to communicate with the workers in the community. This is the import of a recent Supreme Court decision that reverses a pro-union ruling of the National Labor Relations Board. Several chemical companies had been involved in similar disagreements with unions, and now should be able to rely on this unanimous high court opinion—written by Justice Stanley Reed—to support their



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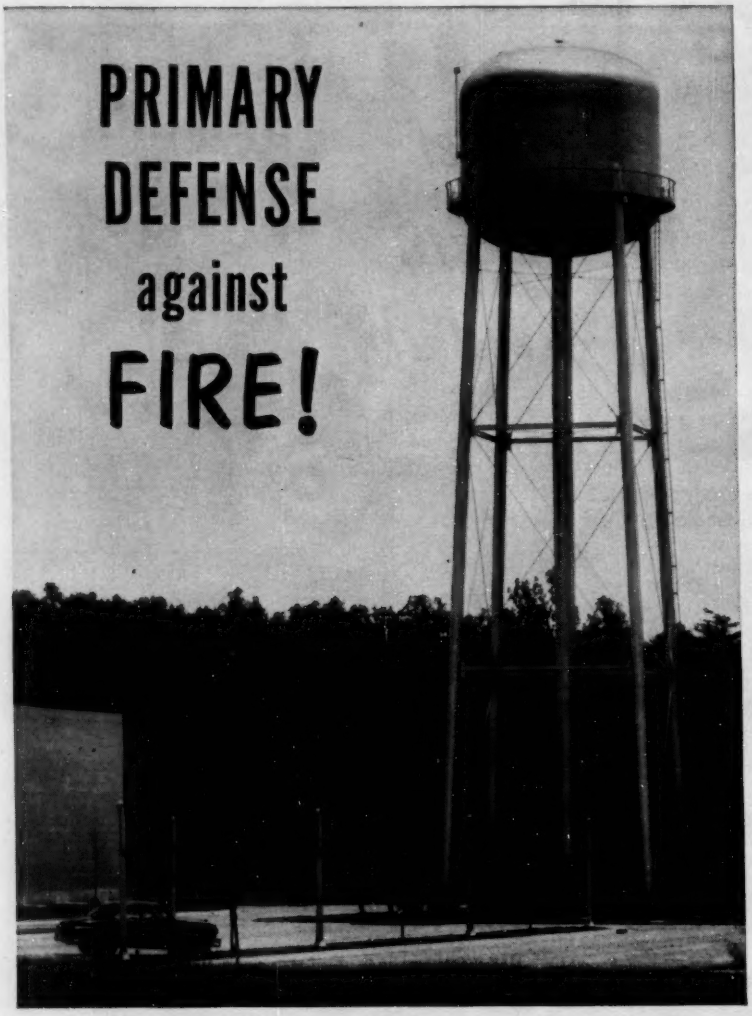
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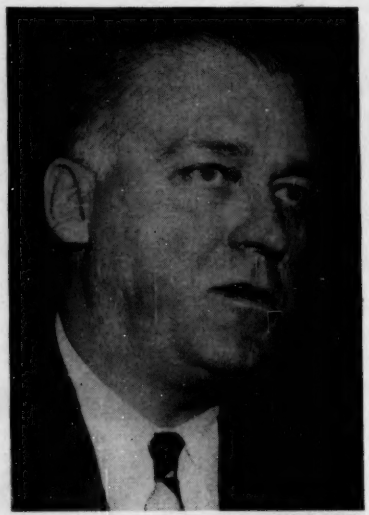
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WIDE WORLD

GOVERNOR ROBERTS: For Rhode Island workers, a statewide minimum.

position. Specifically, the eight justices (John Harlan did not participate) held that in refusing to let union organizers use plant parking lots, the three companies concerned had not unreasonably impeded their employees' right to organize.

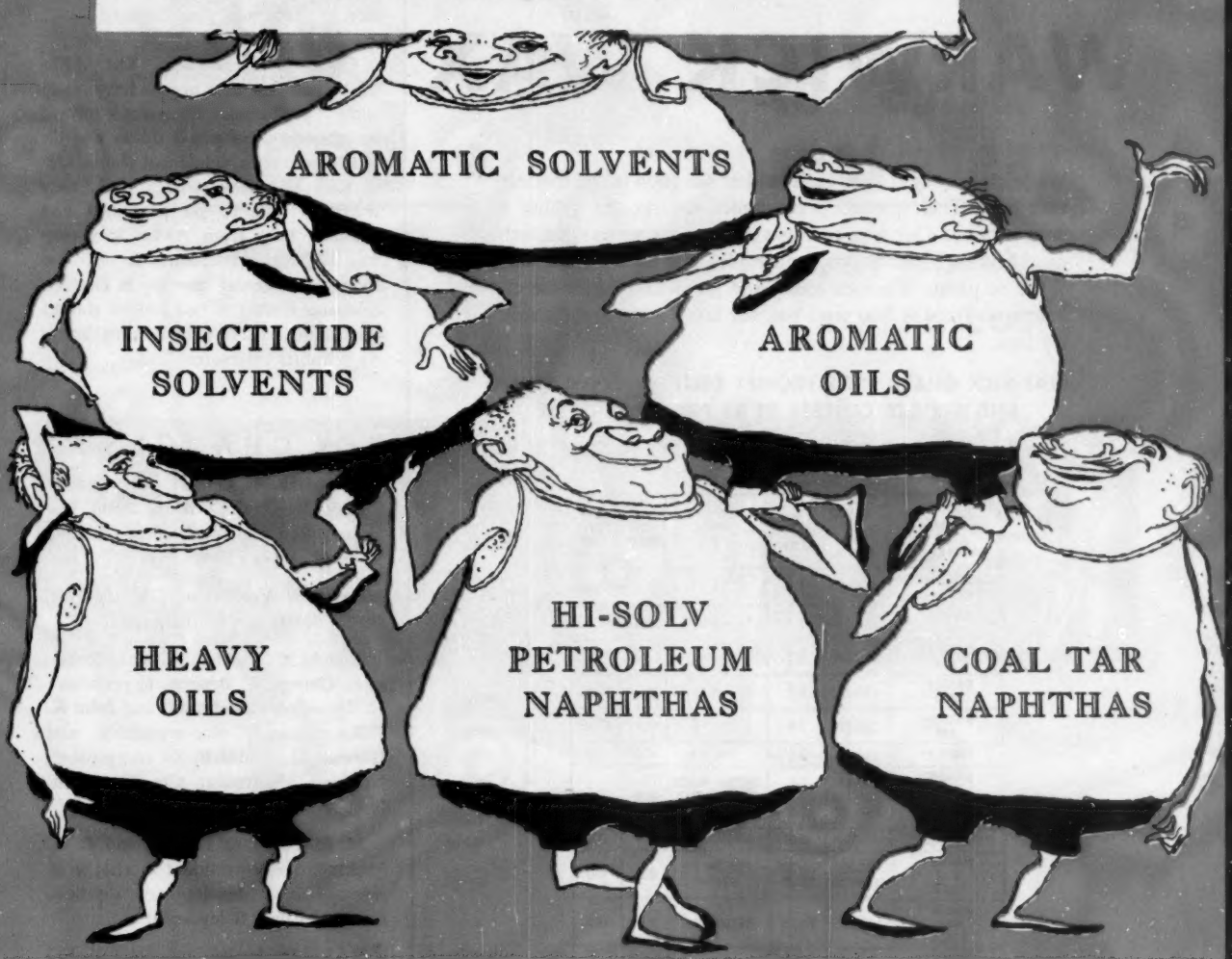
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State Wage Laws: Following the federal government's lead in raising the federal minimum wage rate to $1/hour (effective last March 1), several states are considering upward revision of their statewide minimum wages. Gov. Dennis Roberts had recommended a $1 minimum in Rhode Island, but the legislature passed a bill calling for a 90¢ wage floor. The Massachusetts legislature is working on a bill that would boost the minimum there by 10¢/hour to a flat $1. Wisconsin's State Industrial Commission has set new minimum wage rates for women workers at 70¢ in cities, 60¢ in towns, 50¢/hour elsewhere.

•

Showing the Books: In another important labor case, the U.S. Supreme Court said that a North Carolina employer was guilty of an unfair labor practice because he had opposed a union's demand for higher wages by "claiming inability to pay without making the slightest effort" to back it up. This doesn't mean that employees are automatically entitled to "substantiating evidence" when the employer cites economic inability to meet wage demands. In fact, Justice Hugo Black, in his majority opinion, declared that

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CARDIS* 314	184-189	4-6	4-5	13-16	45-55
CARDIS* 319	180-185	5-7	4-6	18-20	65-70
CARDIS* 320	180-185	5-7	4-5	28-30	75-80
CARDIS* 262	195-200	3-5	BROWN	14-17	40-45
FORTEX*	190-200	3-5	2½-3½	0.0	0.0
MEKON* B-20 A-20 Y-20	190-195 190-195 190-195	3-5 3-5 3-5	BROWN-BLACK AMBER-6 MAX. YELLOW-3-3½	0.0	0.0
POLYMEKON**	200-MIN.	0-3	YELLOW	0.0	0.0
WARCO* WAX 150-A	145-155 145-155	15-20 15-20	YELLOW 1-2 BROWN	0.0	0.0
WARCO* WAX 170-A	170-175	10-15	YELLOW 1-2	0.0	0.0
WARCO* WAX 180	180-185 180-185	4-7 4-7	WHITE BROWN	0.0	0.0
WARCOSINE*	150-155	15-20	WHITE	0.0	0.0
PARAFFIN	136-138 ASTM		FULLY REFINED		
CANE WAX 700	169-174	1.0-1.5	BROWN	25-30	70-90
CANE WAX 500	171-176	3 MAX.	LIGHT BROWN	25-35	55-70
CANE WAX 517-711	170-175	2 MAX.	BLACK	—	—

*® **Patent Applied For

A Subsidiary of Sun Chemical Corporation

Warwick Wax Co., Inc.

Tenth Avenue and 44th Street, Long Island City 1, N. Y.

DIVISIONS OF SUN CHEMICAL CORPORATION

HORN (paints, maintenance and construction materials, industrial coatings) • WARWICK (textile and industrial chemicals) • WARWICK WAX (refiners of specialty waxes) • RUTHERFORD (lithographic equipment) • SUN SUPPLY (lithographic supplies) • GENERAL PRINTING INK (Sigmund Ullman • Fuchs & Lang • Eagle • American • Kelly • Chemical Color & Supply Inks) • MORRILL (news inks) • ELECTRO-TECHNICAL PRODUCTS (coatings and plastics) • PIGMENTS DIVISION (pigments for paints, plastics, printing inks of all kinds) • OVERSEAS DIVISION (export) • A. C. HORN COMPANY LIMITED (Canada) • FUCHS & LANG de MEXICO, S. A. de C. V. • GENERAL PRINTING INK CORPORATION OF CANADA, LIMITED.

ADMINISTRATION . .

it's up to the National Labor Relations Board to decide—in each case, under all the circumstances—whether each side has met its Taft-Hartley obligation to bargain in good faith.

•

Chemical Organizing: The AFL-CIO's two chemical unions have made some "preliminary progress" toward an agreement on which union will try to organize which chemical plants. Until they complete such a pact, they won't be able to get personnel and financial help from AFL-CIO's central organizing department. At last fortnight's one-day meeting in Denver, delegates from the two unions started assembling a list of plants where there's no "conflict of interest."

KEY CHANGES

Frederick A. Gilbert, to president, Becco Chemical Division, Food Machinery and Chemical Corp. (Buffalo, N. Y.).

Kenneth V. Zwiener, to director, G. D. Searle & Co. (Chicago).

Melvin C. Eaton, to board chairman, **George W. Bengert,** to president, **H. Thornton Hildebrandt** and **John K. Hill,** to senior vice-presidents, and **Gideon M. Blaisdell,** to comptroller, Norwich Pharmacal Co. (Norwich, N. Y.).

M. R. Clapp, to director, and **T. W. Mastin,** to vice-president in charge of research and development division, Lubrizol Corp. (Cleveland).

R. U. Haslanger, to director, Escambia Bay Chemical Corp. (Cambridge, Mass.).

Irving Q. Sarlin, to president, John B. Moore Corp. (Nutley, N. J.).

Grant S. Brown, to manager of research, development and engineering department of Plax Corp. (Hartford).

M. J. Skeeters, to manager of research, Chlorinated Products Division, Diamond Alkali Co. (Cleveland).

KUDOS . . .

To **R. Lindley Murray,** board chairman, Hooker Electrochemical Co. (Niagara Falls, N. Y.), the 1956 Chemical Industry Medal of the American Section, Society of Chemical Industry.

Hard faced to resist seat wear

WITH STELLITE

...at no extra cost!



GP Globe Valve-Series 800

Stubborn resistance to valve seat wear, due to erosion, corrosion and galling, is built into Vogt GP valves with Stellite faced seating surfaces used in conjunction with hardened discs and wedges. By an exclusive method, hard facing alloys are welded to the integral seat of globe and angle valve bodies and to the removable stainless steel seat rings of gate valves.

This important feature, available at no extra cost, assures operation economies and longer valve life. A catalog describing the complete General Purpose line of valves in sizes ¼" to 2" will be sent on request.

Adv. No. 3 in a series describing the features of Vogt GP valves.



Write For Your FREE COPY of Supplement No. 1 to Catalog F-9. Address Dept. 34-FGW.

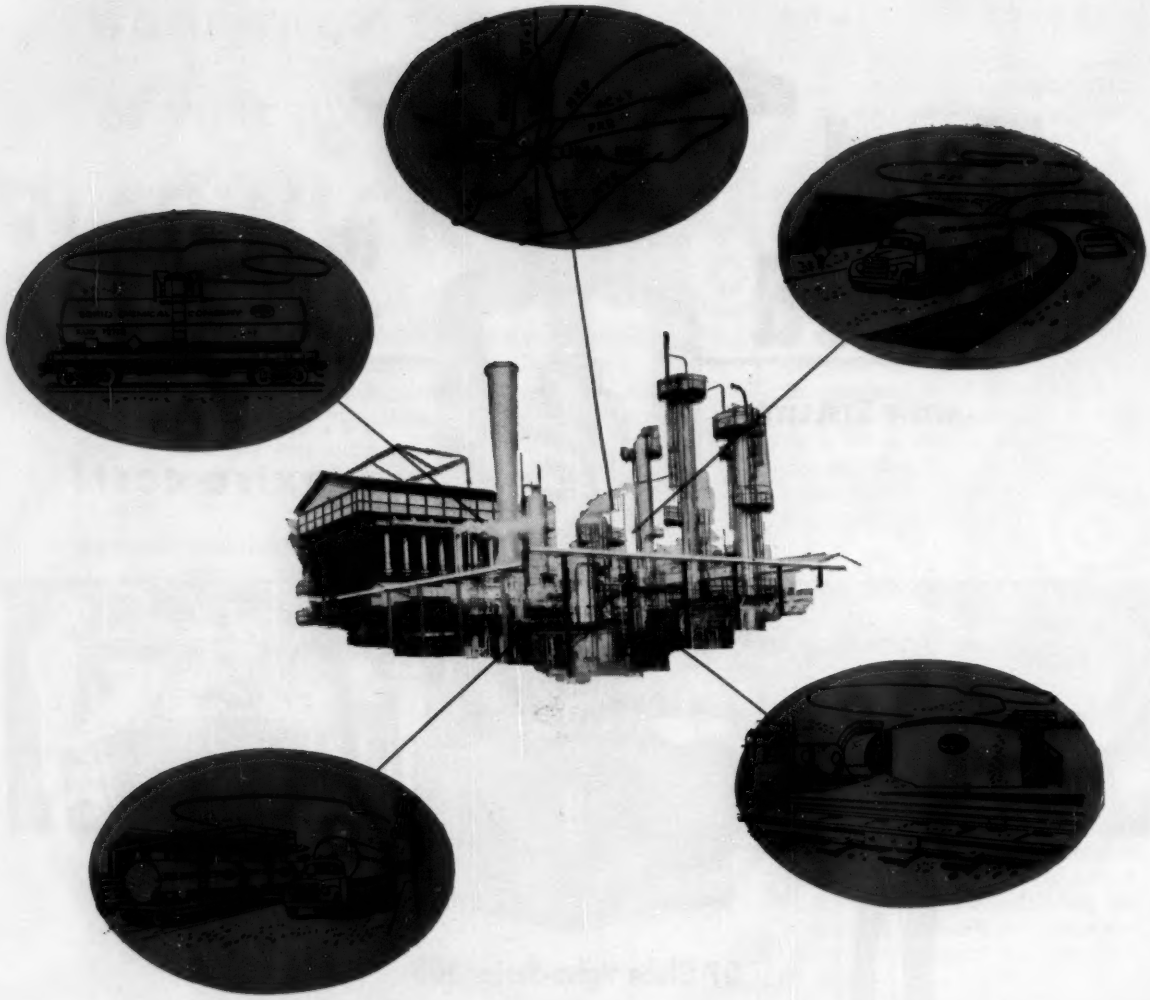
HENRY VOGT MACHINE CO.
P. O. Box 1918 • Louisville 1, Kentucky

SALES OFFICES:
New York, Philadelphia, Cleveland, Chicago, St. Louis, Charleston, W. Va., Cincinnati, Dallas, San Francisco

Vogt GENERAL PURPOSE GP Vogt FOR BETTER VALVES

DROP FORGED STEEL

VALVES



"Built-in" customer service

Advanced planning blue-printed Sohio's Lima plant with you — the customer — in mind. Every phase of the operation has been keyed to the smooth servicing of your orders . . . fast, efficient, dependable delivery . . . and service *when you need it.*

. . . *and we're serious about service at Sohio*

- **YOUR CHOICE of rail or truck delivery.**
- **SOHIO'S NEW TANK CAR fleet moves rapidly out of Lima on 5 rail lines — Nickel Plate, B&O, Erie, Penna and DT&I.**
- **REGULAR TRUCK DELIVERY within 150 miles of Lima with Sohio's new fleet of tank trucks.**
- **LARGE STORAGE AND LOADING FACILITIES that mean product for you when you want it.**
- **Anhydrous and Aqua Ammonia**
  Nitric Acid
  Urea

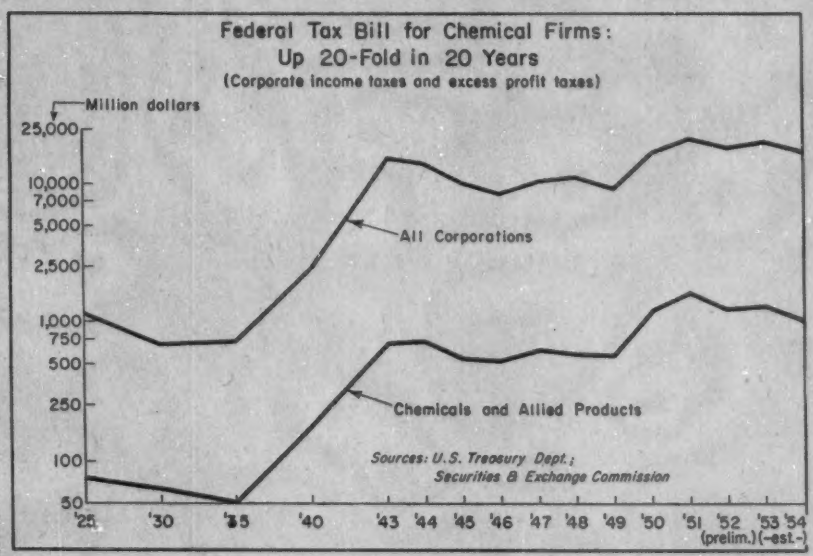
SOHIO

SOHIO CHEMICAL COMPANY

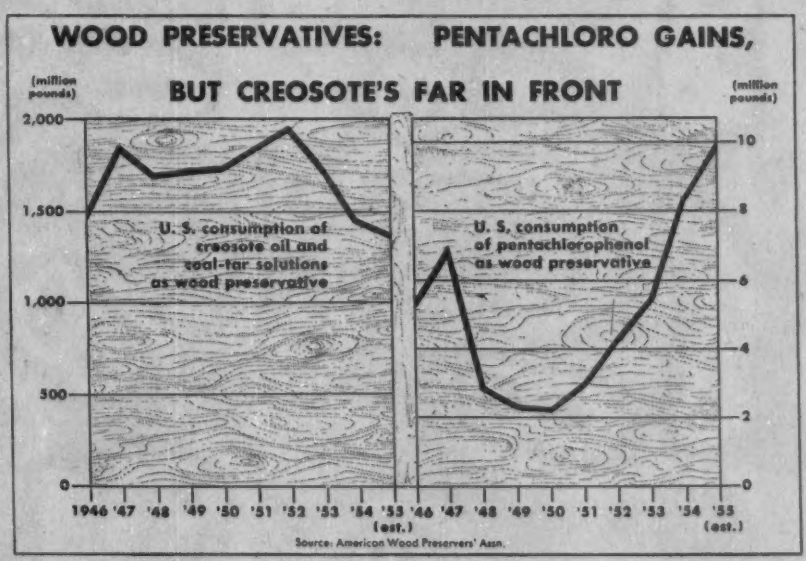
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Charting Business

CHEMICAL WEEK
May 19, 1956



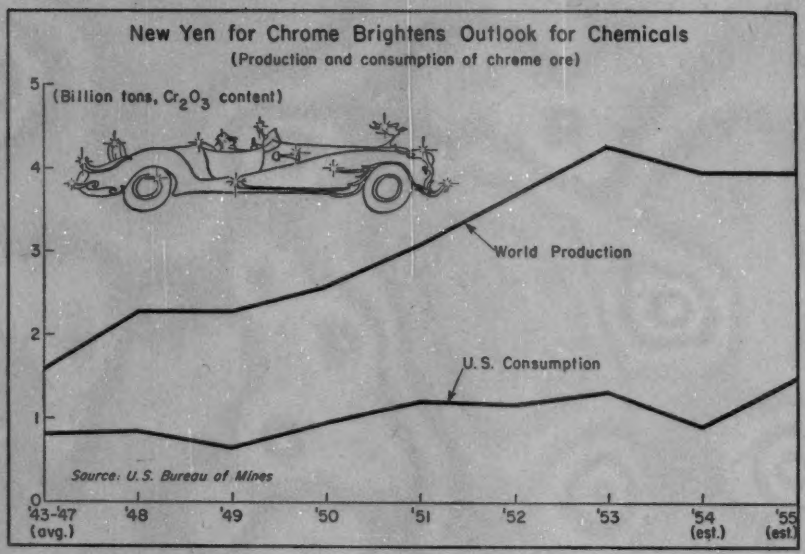
WITH LESS than 2% of nonfarm employment, companies making chemicals and allied products pay more than 6% of total federal taxes on corporate income and excess profits. This tends to confirm that U.S. chemical firms do a much better than average job for stockholders, with earnings consistently higher —on a size-of-company basis—than in most other industries. The chemical industry's biggest share of the federal income tax load: 8.9%, in 1930.



CREOSOTE'S strongest opponent as a wood preservative is pentachlorophenol—its usage in this application has increased more than 300% in the past five years. But creosote is still the overwhelming favorite in the field, and despite a fall-off of nearly 30% since its post-war peak in 1952, it outpaces pentachlorophenol in wood preserving by more than 137-to-1. One major factor: railroad companies' unwavering devotion to creosote for treating crossties. This alone accounts for 40% of all U.S. creosote consumption.

Charting Business

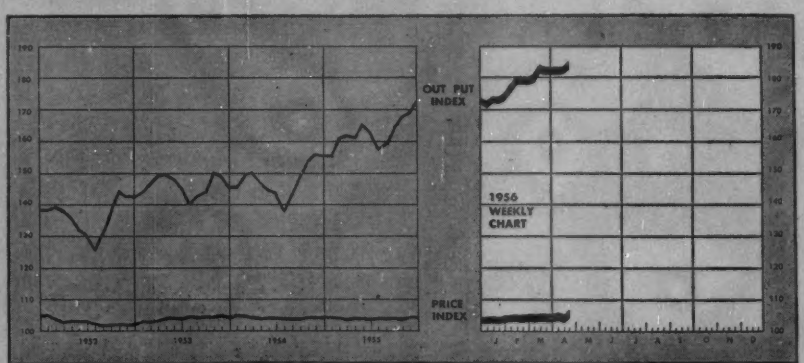
(Continued)



RISING popularity of chrome-plated trim and fixtures doesn't mean much in consumption of chromic acid, sulfuric acid and sulfates in electroplating. A few ounces of those materials go a long way, because chrome plate is only about 1/50,000th of an inch thick.

But in some less showy applications, there's increasing demand for chromium in alloys, refractories, chemicals and pigments. And this means that more heavy chemicals are being used in refining chromite ore and recovering chromic acid.

BUSINESS INDICATORS



WEEKLY	Latest Week	Preceding Week	Year Ago
Chemical Week Output Index (1947-49=100)	183.2	183.1	163.9
Chemical Week Wholesale Price Index (1947=100)	105.9	106.0	104.3
Stock Price Index of 11 Chemical Companies (Standard & Poor's Corp.)	490.3	491.6	414.2

MONTHLY Foreign Trade (million dollars)	Exports			Imports		
	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
Chemicals, total	96.7	89.8	84.1	23.5	26.4	20.4
Coal-tar products	6.1	5.8	6.6	2.9	4.4	2.5
Industrial chemicals	15.1	14.9	11.5	7.5	8.5	5.4

Eastman plasticizers

dimethyl phthalate
diethyl phthalate
di-(methoxyethyl) phthalate
di-isobutyl phthalate
dibutyl phthalate
di-isobutyl adipate
triacetin
tributyrin
di-(2-ethylhexyl) adipate (DOA)
dioctyl phthalate (DOP)
di-isooctyl phthalate (DIOP)
dioctyl azelate (DOZ)
plasticizer 84
—an octyl butyl phthalate

For highest quality finished products, rely on Eastman plasticizers—made under the most exacting and rigid specifications in the industry. Samples and technical assistance furnished upon request. Also write for our booklet describing Eastman plasticizers and their uses.

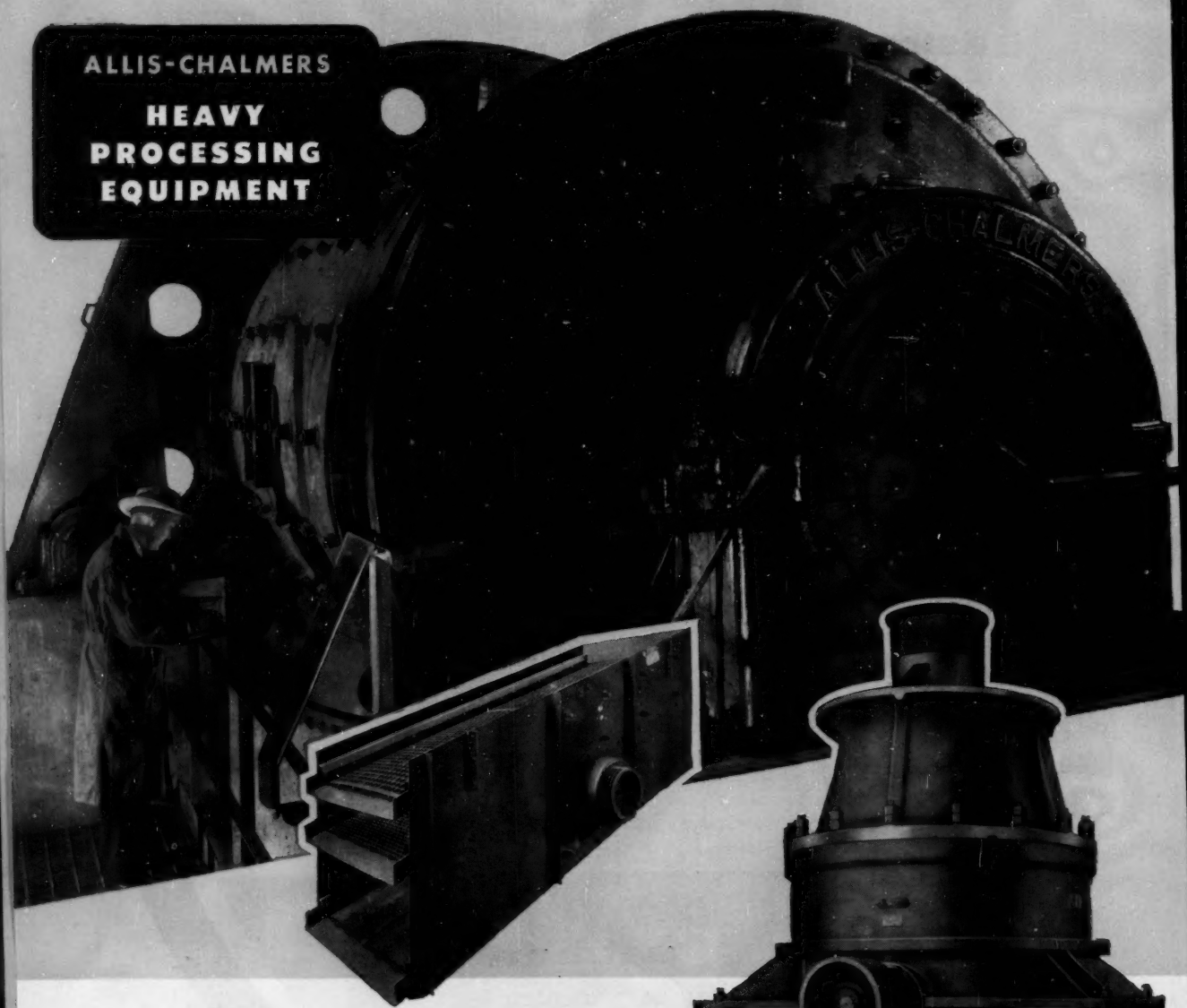
Eastman
CHEMICAL PRODUCTS, INC.
KINGSPORT, TENNESSEE
subsidiary of Eastman Kodak Company

SALES OFFICES: **Eastman Chemical Products, Inc.**, Kingsport, Tennessee; New York City; Framingham, Massachusetts; Cincinnati; Cleveland; Chicago; Houston; St. Louis.
West Coast: Wilson Meyer Co., San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

"Coordineered" for

ALLIS-CHALMERS

HEAVY PROCESSING EQUIPMENT



Allis-Chalmers builds many types and sizes in a given equipment line. As a result, recommendations are completely unbiased... influenced only by your particular requirements.

Grinding Mills — The Allis-Chalmers broad mill line includes rod mills for coarse wet or dry grinding, ball mills for 20 to 200 mesh wet or dry grinding, *Ballpeb* and *Compeb* mills for fine grinds, multi-compartment type for stage grinding.

Crushers — In most Allis-Chalmers gyratory crushers, precise size adjustment, compensation for wear, emergency unloading are all accomplished by the flick of a switch. Four types of jaw crushers, a series of roll crushers and hammer mill are also built by A-C.

Vibrating Screens — Allis-Chalmers makes vibrating screens for scalping, medium and fine separation, wet or dry screening, rinsing and dewatering.

ALLIS-

Unit Operation

Designed to Work Together for Increased Production, Better Products and Greater Profits

As MANUFACTURERS of the most diversified, most complete line of processing *and* electrical equipment, Allis-Chalmers maintains separate departments staffed by specialists for each product. Coordineering results from an interdepartment exchange of ideas and the correlation of specific knowledge and skills . . . *an integration of thinking, planning and engineering.*

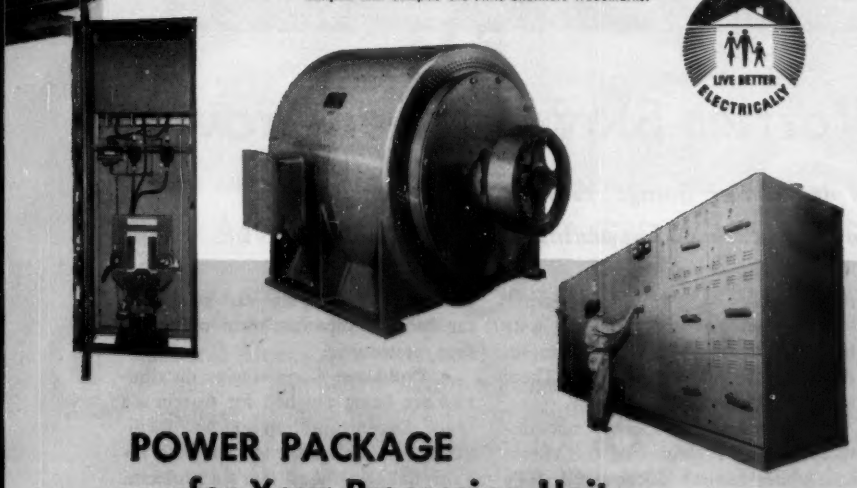
Invaluable Help for Your Staff or Consultants

It all starts with an examination of your present processing operation . . . an expert evaluation that dictates the equipment recommendation. New as well as existing equipment is teamed up in a right-for-the-job application.

Research, too, is a part of coordineering. The Allis-Chalmers laboratory is one of the best equipped, best staffed in all industry. Information gained in laboratory and pilot plant testing helps determine the equipment and process best suited to a given application.

Coordineering embraces many things . . . experience, skill, service, undivided responsibility. And they all add up to the greatest possible operating efficiency for you.

Ballpeb and Compeb are Allis-Chalmers trademarks.



POWER PACKAGE
. . . for Your Processing Unit

Allis-Chalmers Builds the Following "Coordineered" Equipment:

HEAVY	1	Crushers Grinding Mills Screens
PLANT	2	Compacting Mills Roller Mills Screens
PYRO-PROCESSING	3	Furnaces Kilns Coolers Dryers
POWER	4	Generators Condensers Pumps Transformers Switchgear Substations Motors V-belt Drive Control
LIQUID HANDLING	5	A complete line of Centrifugal Pumps
AIR & GAS HANDLING	6	Centrifugal Blowers Axial Compressors Rotary Compressors

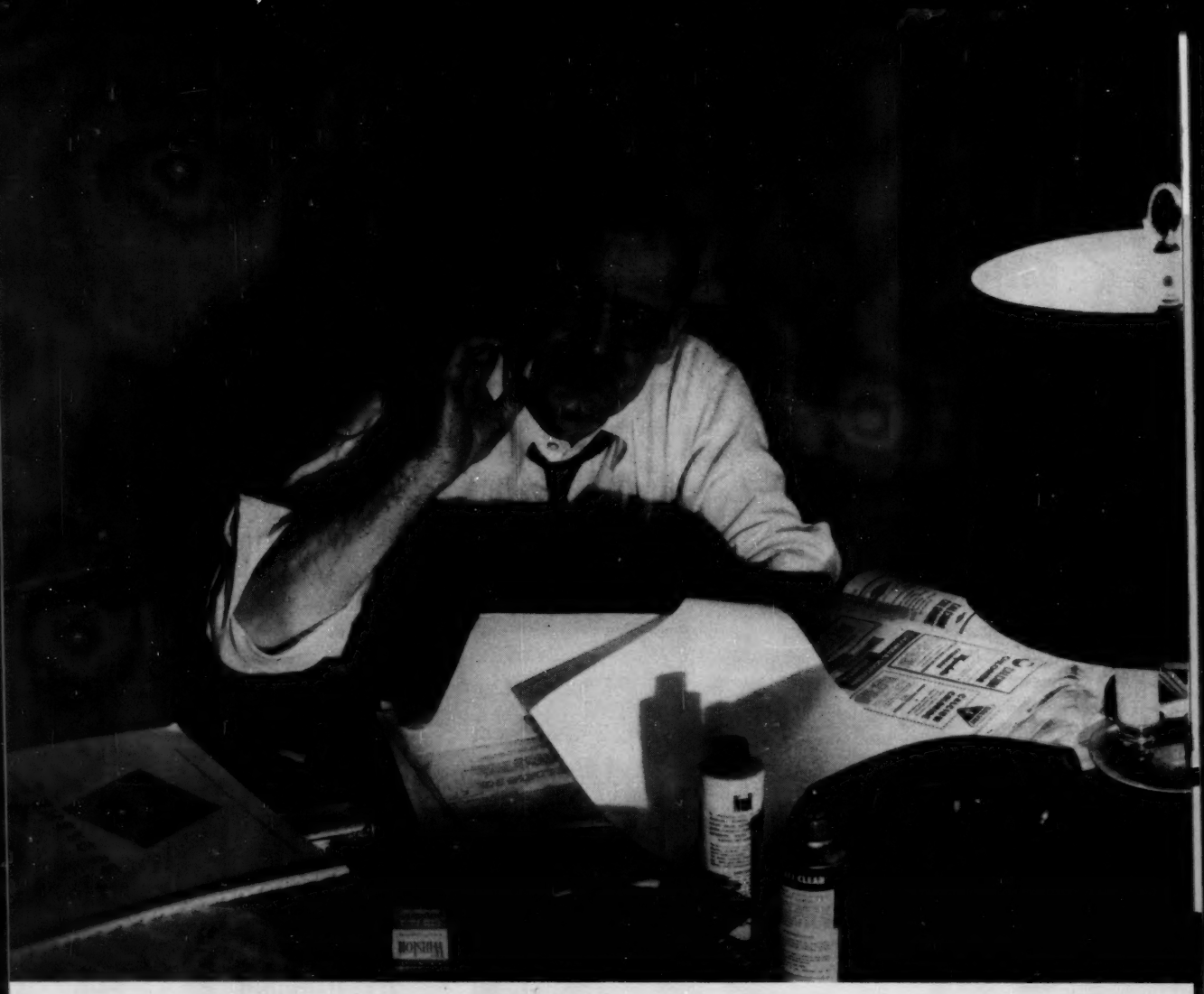
Allis-Chalmers also makes equipment for solvent extraction, electronic heating, metal detection and inter-floor conveying.

Bulletin 25C6177 covers all Allis-Chalmers equipment for the process industries. Bulletins on specific equipment lines are also available. See your Allis-Chalmers representative or write Allis-Chalmers, Milwaukee 1, Wisconsin.

CHALMERS

A-C ALLIS-CHALMERS

A-5077



Looking Ahead Worries Slow Jobber Growth

How is the distributor doing? Trend by trend, problem by problem, idea by idea, here's what's happening, what's in the future . . .

"Business? Right now, it's pretty good. We're 7-8% ahead of last year and we should finish the year that way. Got to work for it though." Judging by a *CW* survey last week, if a representative chemical distributor could be found, chances are that's how he would describe his business today.

"And," he would add, "there's rougher competition coming, especially from price-cutters. You've got to be on your toes; you've got to diversify if you want to stay in business. You've got to plug, plug, plug, and fight back."

In Texas and in Montreal, in California and in New York, in almost every area that was surveyed last week, the consensus was, "business is good."

This optimism was tempered only by those dependent on the auto industry and farm chemicals. There some apprehension was evident.

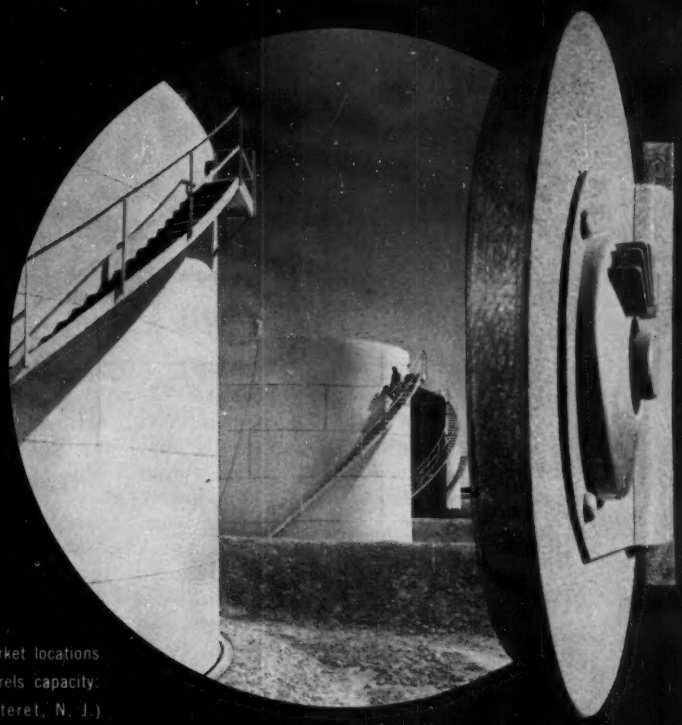
But general prosperity notwithstanding, the problems of the chemical jobber haven't disappeared. He's watching for trouble spots, riding the trends, and searching for expansion opportunities. Broadly, here is today's distributor scene:

- **Sales:** Almost all distributors are beating or matching last year's volume. Most report sales are up 5-10%. There's some concern about next year and beyond, as well as worry over today's slipping car sales, but far more companies were optimistic than pessimistic.
- **Problems:** Surprisingly, distributors are being pinched for warehouse space. Decentralization and new facilities are possible answers, but both require financing. And that's a problem, because the credit situation for small business is tight. Some distributors are pressuring suppliers for faster, more reliable deliveries. Late deliveries from principals are plaguing a few jobbers.

Finding sales manpower is another big worry. Distributors are in real difficulty here, can't match recruitment practices or compensation of-

how to keep a

MULTI-MILLION-DOLLAR SECRET



Six terminals at 5 key market locations with over 12,000,000 barrels capacity: PORT OF NEW YORK (Carteret, N. J.) PORT OF NEW ORLEANS (Good Hope, La.) CHICAGO, ILLINOIS (Bedford Park) • PORT OF HOUSTON (Galena Park and Pasadena, Texas) • CORPUS CHRISTI, TEXAS

General American blends and prepares anti-freeze according to secret formula!

Chances are the anti-freeze for your car came from General American. That's because General American is entrusted wth the secret formula of one of the nation's largest manufacturers of anti-freeze. The manufacturer takes advantage of strategically-located General American terminals—and uses the services of skilled and trusted personnel. Anti-freeze is blended and prepared on the spot—stored and distributed per instructions.

Your lease of General American Tank Storage Terminals can include modern barreling and drumming services. Leased facilities at six "key market" General American terminals give you the privacy, safety, service and flexibility of your own terminals — *without capital investment on your part.*

TANK STORAGE TERMINALS GENERAL AMERICAN TRADE MARK

GENERAL AMERICAN TANK STORAGE TERMINALS
a division of GENERAL AMERICAN TRANSPORTATION CORPORATION
135 South LaSalle Street • Chicago 90, Illinois

May we send you

this brand new, 52 page, illustrated booklet...



... that will show you how UCON synthetic fluids and lubricants can make a difference in your equipment performance, processes, and formulations—and, more than likely, save you money? (Their uses are many and diverse, ranging from mechanical lubricants to cosmetic components to hydraulic fluids.)

Ask for booklet 6500.

CARBIDE AND CARBON CHEMICALS

Carbide and Carbon Chemicals Company

A Division of
Union Carbide and Carbon Corporation
30 East 42nd Street New York 17, N. Y.

UCC

"Ucon" is a registered trade-mark of UCC.

IDEAS FOR PROFITS —

Here's what some wholesalers are doing to boost efficiency:

- Air-conditioned cars for salesmen working in hot climates.
- "Milk route" bulk delivery. Customers install storage tanks, then distributor services them periodically. One jobber will even fill 54-gal. drums on that basis. System saves on price, carboy handling.
- Sample orders for profit testing. Before attempting to sell new customers regularly (especially in outlying locations), one firm takes "trial" orders, then evaluates costs of selling the account.
- Distributors for distributors. A New York wholesaler has shifted very small volume business (under 10 gal.) to lab supply houses to pare packaging and handling costs.
- Horizontal selling. In Philadelphia, a wholesaler has licked the problem of salesmen pushing only their favorites or items in which they specialize. Firm appointed divisional sales managers, who sell products of all departments when on the road, encourage staff to follow suit.

fered by large manufacturers. Too, their need for technical men is growing. A few are attempting college recruitment, some are seeking discontented lab personnel in other companies, others are hiring successful, experienced, nonchemical salesmen.

Price-cutting seems as prevalent as ever and much of it is attributed to newcomers to the field. From Texas comes a comment on "bootlegging." Chemicals from unknown sources are being offered below the price the jobber can buy them for. Answer to price warfare, say most companies, can come only through dependable service and assistance from suppliers.

Transportation costs continue to mount. Recent freight rate increases have pared margins in some cases where passing on extra cost is difficult. Result: increased attention to profitability of some accounts, some shifting to common carriers to service out-of-town accounts.

• **Trends:** Happiest and most prevalent trend distributors report is the growing switch to jobbers to handle less-than-carload business. This may account, in part, for the current level of wholesaler well-being. Unless there's a depression, few fear invasion by suppliers of the drum-quantity market.

A move by distributors to selling in bulk quantities appears pronounced. Example: in Canada and Illinois jobbers are buying compartmentalized tank wagons for large-volume deliveries, lower delivered prices.

Diversification—through new product lines that reach other industries—is widespread, is credited with a big assist in business growth. Some are wary, fear "spreading too thin."

Not strong yet, but a possible future trend is diversification into simple manufacturing and formulation operations. Said several, "That's where the money is." Repackaging is likely to spurt ahead, too.

• **Supplier Relations:** Generally, distributors are on harmonious terms with principals and have few gripes. But scattered complaints do appear. The most frequent comment: "Margins could be better, especially since that hike in freight rates." And calls were heard for more personal contact with distributors by the suppliers, lighter-weight packaging, and better end-use information for products.

• **Future:** Expansion is uppermost in the thoughts of most jobbers. The means: diversification will, of course, play a big role. Sales force expansion with technically trained people (mentioned by many) will aid in reaching new outlets, deeper penetration of old markets. Branch locations (i.e., the distributor "chain") also figured prominently in future plans of some.

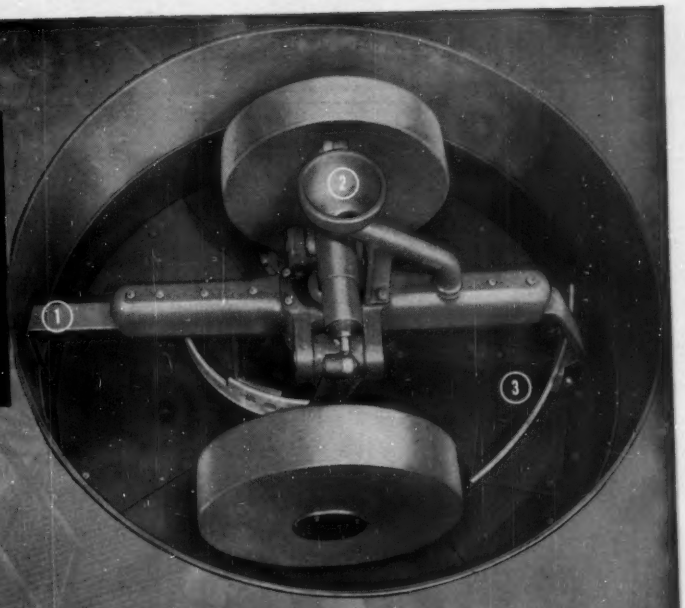
Although branching poses problems for suppliers (e.g., conflicts in jobber territories), it's a welcome worry. What's growth for the wholesaler is growth for the supplier. And more and more are helping jobbers to expand, to solve their problems.

HERE'S WHY THERE'S

NO BUILD-UP PROBLEM

WITH

SIMPSON MIXED MATERIALS



Automatic, bottom discharge and self cleaning action speeds mulling and reduces mixer maintenance

The photo above offers proof of why the Simpson Mix-Muller is preferred by operators who want a *thorough* blend of dry, wetted or plastic materials.

Take a good look at it—you can *see* why this simple, efficient design can assure these *welcome* mixing features:

A CLEAN MIX — (1) Crib scraper and plow action *eliminate* build up of material, guard against contamination of mix and assure formula control. Muller scrapers are available, too. (2) An integral funnel guides liquid additions to path of mullers to assure no waste and fast mixing.

A THOROUGH MIX — Fast efficient muller and plow action quickly disperses minute quantities of ingredients. Bottom discharge (3) is automatic, almost instantaneous.

AN ECONOMICAL MIX — You use less horsepower because power is used only to mix — *not* to drive pan or power discharge. You can gain *absolute* control over character of mix. Result? A controlled mix and *an end product* faster, and at less cost.

Simpson Mix Mullers are available in a range of batch capacities of 1/10 to 60 cubic ft. and are described in our new bulletin, "Mulling for the Chemical & Process Industries." Write for your copy today.



SIMPSON *MIX-MULLER*® DIVISION

NATIONAL ENGINEERING CO., 642 Machinery Hall Bldg., Chicago 6, Ill.



℞ for Better Pharmaceutical Advertising

√ Promote drugs as aid to, not substitute for, doctor's skill.

√ Inform—be frank about side effects, drawbacks of drugs.

√ Don't knock competitor products—it hurts whole industry.

√ Tell doctors of new drugs first—not the general public.

√ Don't serve warmed-up product as new, or copies as originals.

Drug Ads: Honesty Pays

Ethical drug makers are now doing some intensive probing into their advertising practices. Reason: in the last few years, the amount of time that doctors spend with the various forms of advertising media has been reduced from 3½ to 2½ hours/week. This includes time spent with medical service representatives, as well as reading time for direct mail, medical journals and external house organs. Some $250 million/year are being spent to reach approximately 150,000 physicians; some 300 million pieces of mail are showered on them.

The problem of making this shortened period of attention more effective was the big topic at the recent meeting of the Pharmaceutical Advertising Club in New York. Seventeen speakers from Pfizer, Schering, Parke, Davis, Lederle, and Ciba addressed the group for 6½ hours, emphasized some embarrassing but valuable facts.

Consensus: pharmaceutical companies, caught in the competitive scramble, have been so busy knocking each other, that they've lost sight of the real target—the regard of the medical profession, their consumer public. Specifically, they feel that the pharmaceutical industry has been guilty of two big mistakes: failing to give an accurate picture of itself to the medical industry, failure to instruct the physician instead of trying to sell him.

Correcting these faults won't be easy, according to most of the speakers. Squabbling between the pharmaceutical companies—running down competing products, highlighting side effects—has, they say, had a bad effect on the whole industry. Faced with claims and counterclaims of different drug makers, the doctor has become cynical, doubts the efficacy of the pharmaceutical industry and its products.

Winning back the esteem of the doctor calls for something more subtle than a frontal attack. The strategy: enhancing the physician's reputation in the eyes of his community, woo his gratitude (and trust) by helping him. This tack, part psychological, part public relations, is looked on as a way of helping both medics and drug makers.

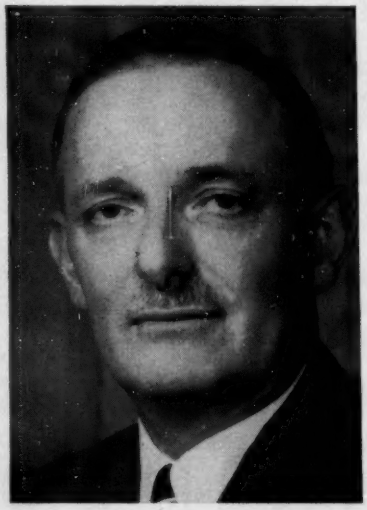
One of the big weapons being used by pharmaceutical companies to bring the doctor's story to the fore is television—both in closed-circuit and commercial form. Lederle has a series of local programs titled "Conquest of Disease." Pfizer has made lay versions of some of its films—Nephrosis in Children, Disability in the Aged—available to TV stations without cost. Probably the most ambitious programing is Ciba's. Now in its third year, its network series "Medical Horizon," has grown from 13 to 39 half-hour programs per year. All play up the doctor's role, have little or no sales message.

Besides TV, use of newspapers (one Dallas paper now has a medical supplement), radio and other mass media have been advocated to make the public aware of the doctor and his problems.

Paul Roder, vice-president of Ciba, urges more extensive use of what he calls "service materials." These help the doctor do his job, include such items as newsletters, special reports, external house organs. The idea here, as in mass-media promotion, is to soft-pedal the sales angle, push the service aspect.

In advertising direct to the doctor by direct mail, medical journal advertising, etc., the point brought up most often was the need for first informing the doctor, then selling him.

This should be made manifest in advertising copy by picturing drugs as an aid to, not a substitute for, the doctor. Pointing out that much advertising fails to recognize the doctor's pre-eminent role in the treatment of the sick, Walter Griffith, of Parke, Davis, stressed that "the doctor wants to feel that his skill is more important than your drug."



SCHERING CORP.'S BROWN: New ethics for ethicals.

Vital protection for your products

DOW



A Report to Three Key Industries

ON DOWICIDE PRESERVATIVES

New booklets for the ADHESIVE, PAINT and VARNISH, and PAPER and FIBRE BOARD industries give detailed product protection information

For you who are responsible for maintaining the quality of your firm's products, Dow has prepared these three information-packed booklets on the application of Dowicide® preservatives.

For adhesive—a discussion of mold growth, bacterial attack and odor problems in starch-based, protein-derived and synthetic adhesives. *For paint and varnish*—factors affecting mold development, desirable characteristics of a preservative, and adding preservatives to the product. *For paper and fibre board*—preservatives for manufacturing operations, methods of incorporating preservatives into pulp, paper, and fibre board products.

Dowicide preservatives play equally important roles in other fields of industry—building materials, floor coverings, textiles, leather, petroleum, cosmetics and waxes, to name a few. Many firms have found that Dowicide products pay their own way by increasing production efficiency and assuring product quality.

Perhaps your products have an application for one or more of these efficient, versatile preservatives. The Dow laboratories can give you practical technical assistance on your product protection problems. For specific information on this helpful service, write today to THE DOW CHEMICAL COMPANY, Midland, Mich., Dept. DP 962A.

THE DOW CHEMICAL COMPANY, Dept. DP 962A, Midland, Michigan

Please send me a copy of the Dowicide booklet on

☐ Adhesives ☐ Paint and Varnish ☐ Paper and Fibre Board

☐ Information on my product (My product is _____)

Name _____ Firm _____

Address _____ Title _____

City _____ Zone _____ State _____

you can depend on DOW *CHEMICALS*

DOW

The Quaker Oats Co.
Keeps product and plant
CLEAN
in SSIRCO steel drums



Color decoration and inscription silk screened to specification for The Quaker Oats Co.

Quaker Oats FURFURYL ALCOHOL

Furfuryl Alcohol is an important chemical made from agricultural residues distributed by The Quaker Oats Company. Because Furfuryl Alcohol is a powerful penetrant, they exert extra precaution in the chemical's handling and storage, and containers must be unusually tight. That's why they rely on SSirco steel drums to keep the plant clean and the product constant, day after day; in storage and in shipment.

SSIRCO DRUMS are built with special hi-bake liners which guard against rust and corrosion. Only the highest grade steel is used in the manufacture of these drums. This means they will take a pounding, almost indefinitely, without danger of seepage or leakage.

IN ADDITION to standard drums, SSirco manufactures, lines and decorates drums to fit individual specifications, in 30- or 55-gallon capacities, and other special sizes.

For full details, contact either our Birmingham plant or Atlanta general office.

CONTAINER DIVISION
SOUTHERN STATES IRON ROOFING CO.
SALES OFFICE AND PLANT
2830 Fifth Avenue, North
BIRMINGHAM, ALABAMA

However, there was argument as to how much this role of the doctor should be highlighted. Some felt that equal credit should be ascribed to the role of drug and doctor; others were for all-out pandering to the doctor's ego, playing him up as a hero.

Francis C. Brown, president of Schering, spoke out plainly for these standards for advertising:

- Be informative.
- Make frank disclosure of drawbacks.
- Don't knock competitors.

In addition, Brown suggested elimination of such practices as playing up warmed-over products as something new, hitching rides on another company's wagon by using similar trademarks, exploiting others' research by carbon-copy product development. He also warned of the bad effect of assuming that the pharmaceutical company knows better than the doctor what the doctor's needs are.

Unethical practices, he stressed, make doctors suspicious of all claims, disillusion them, lead to their acceptance of generic names rather than tradenames. At that point, continued Brown, "don't be surprised if the profession and the public turn more and more to that dreadful condition we call socialized medicine."

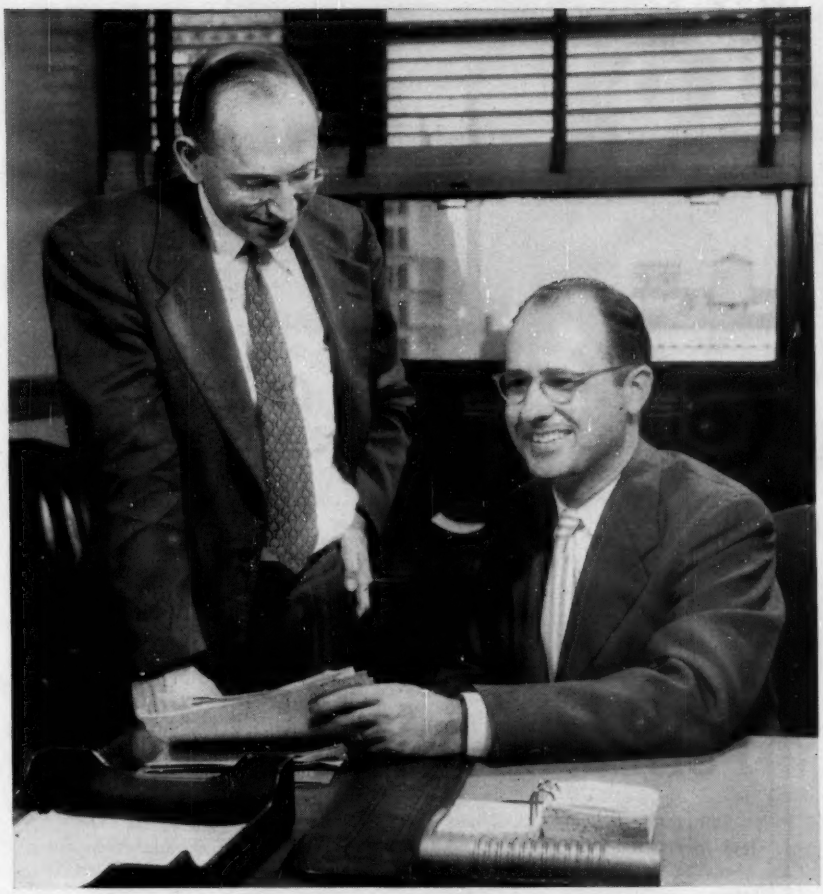
Though many of the pharmaceutical representatives paint a picture of their companies wrestling with a guilty conscience, it's not easy to see any deep effects of their "sins" upon drug sales. If the doctor has been slighted, it doesn't show up in the form of curtailed sales. Also, acceptance of a new therapy—which once took five or six years—is often a matter of only a few months now. In the case of tranquilizers it happened almost overnight.

Whatever the physicians' attitude toward the drug makers' promotion, the increased consciousness of a need for a more ethical approach and a determination to improve will work for better relationship in the future between these two mutually dependent forces.



'Fishy-Backing' up the Coast

A NAUTICAL VERSION of "piggy-backing" has just begun operating between Houston, Tex., and Newark, N.J. Dubbed Sea-Land Service by its originator, Pan Atlantic Steamship Co., but more widely known as "fishy-backing," the system offers water shipment for loaded trailers. Vans are detached from the tractor at the port, fitted into slots on the ships. Weekly voyages are scheduled. The vessel, the *SS Ideal X*, can carry 58 trailers.



C. E. Kaufman (left), Product Development Manager, Calgon, Inc., discusses the properties of the Pluronics with Ralph N. Thompson, Research Manager.

"Pluronics offer a combination of properties not available in any other single surfactant"

—Ralph N. Thompson, Research Manager, Calgon, Inc.

"We manufacture products for treating water from source to disposal," relates Calgon's Research Manager Ralph N. Thompson.

"In our various research activities, we have been, and are now, thoroughly evaluating the Pluronics —Wyandotte's unique series of surface-active agents.

"We have established that the Pluronics have a relationship . . . one grade to another. Consequently, by evaluating the different grades, we've found that combinations of properties can be obtained with Pluronics which are not obtainable in any other single surfactant by itself.

"To date, two of the properties of the Pluronics have been sufficiently unique to enable us to develop one completely new product, as well as to revitalize and improve one of our present important products."

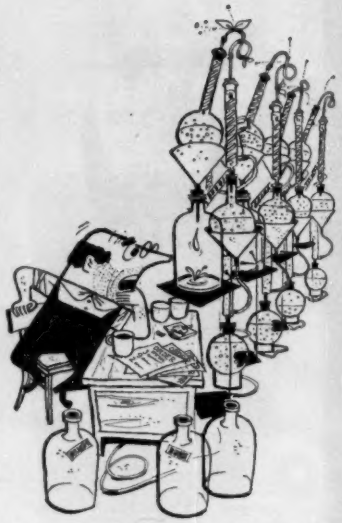
Perhaps *your* products can be improved using a Pluronic.* We at Wyandotte have recently compiled a new "Pluronic Grid," whereon the property trends of the Pluronics are plotted.

By studying these trends, the formulator may select those Pluronic grades with the best balance of properties for his application . . . eliminating random testing, saving valuable research time. This organized approach does not, however, eliminate the need for evaluation of the Pluronics in your own laboratories. Write today for samples and your free "Pluronic Grid." *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in principal cities.*

*REG. U.S. PAT. OFF.

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CHEMICALS
MICHIGAN ALKALI DIVISION
HEADQUARTERS FOR ALKALIES

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Muriatic Acid • Calcium Carbonate • Calcium Chloride
Glycols • Chlorinated Solvents • Synthetic Detergents
Other Organic and Inorganic Chemicals



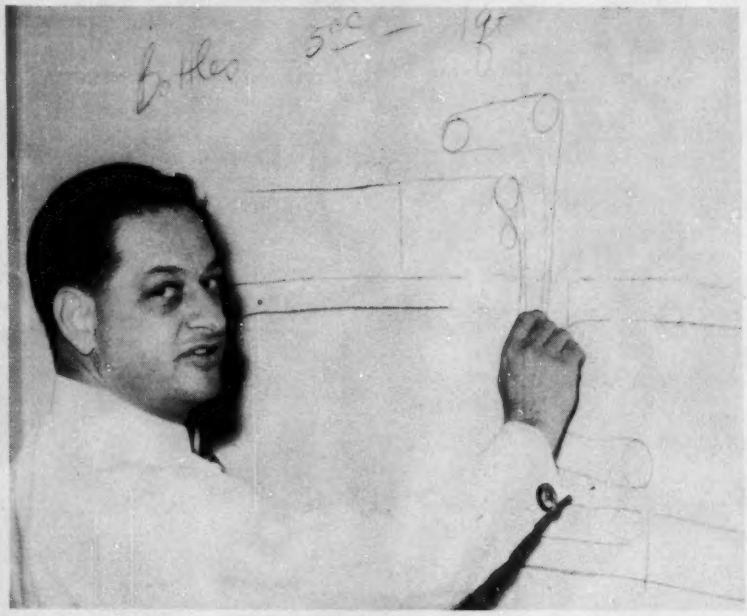
It's better
to get it from
Eastman . . .

Sure, when you need an uncommon organic (or an uncommonly pure one) in more-than-test-tube and less-than-tank-car quantities, try Eastman Organic Chemicals Department, *Distillation Products Industries*, Rochester 3, N. Y.

DPi

there are some 3500 Eastman Organic Chemicals for science and industry

DISTILLATION PRODUCTS INDUSTRIES
is a division of
EASTMAN KODAK COMPANY



PARKE, DAVIS' SRIGLEY: For a stable labor force, a mathematical . . .

Formula for Manpower

Smoothing out the peaks and valleys in charting packaging manpower needs is always a smart trick. But when, as Parke, Davis has just revealed, it's done by mathematical formula, it's extraordinary.

Parke, Davis has been quietly developing such a formula for several years, is now using it in operating its new, highly automatic fluid finishing division at Detroit without labor disruption (*CW, April 28, p. 104*). And the company expects the same algebraic expression will meliorate any future contracts for supplementary unemployment benefits (SUB) or guaranteed annual wage (GAW).

The faith that Parke, Davis puts in the formula is well founded. The equation allows manpower needs for the finishing division to be computed as much as six months ahead with an error of less than 3%. The division handles several hundred products in a large number of different sizes.

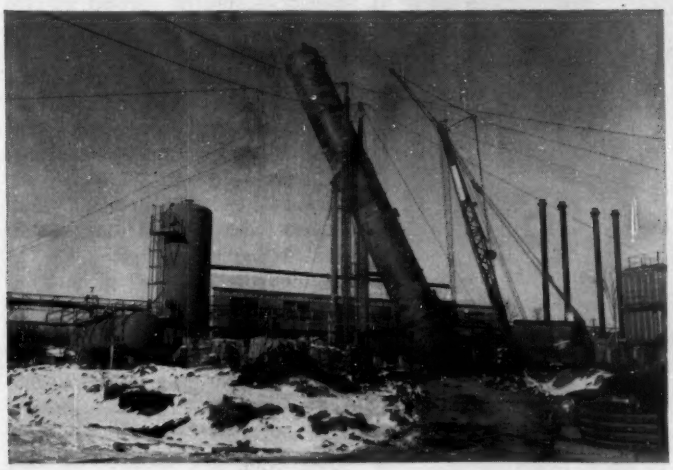
Despite the size of the operation, the formula is simple. The number of employees required per month (E) equals the standard hour demand (H_s) times a constant (K) divided by number of hours per operator available per month (H_m) times a three-month average performance or efficiency (P_a). It's derived, explains its inventor, Leland Srigley, P-D's superintendent of general finishing, this way:

- Ratio of planned to unplanned production is calculated by studying the past six months' production record. Planned items appear on sales forecasts; unplanned items do not, are produced on the basis of minimum stock or specific order.
- Total number of planned packages due each month is multiplied by the standard time needed to do each package. Result: total standard hour demand for planned products. To this is added an estimate of unplanned production time derived from the ratio.
- The constant is 1 plus the sum of the ratios of various types of unproductive time to the actual ("direct") time on production. These unproductive times are: vacation, leaves of absence, absenteeism and lateness, indirect work, off-standard work, and downtime. All are expressed on an hours-per-month basis.

By evaluating the individual factors each month, future values of "K" can be determined.

The constant varies, but is generally between 1.3 and 1.9. For maximum







On the job at Searsport, Maine. Building anhydrous ammonia plant of Northern Chemical Industries, Inc., an affiliate of The Summers Fertilizer Company, Inc.

HIGH-TEMPERATURE HIGH-PRESSURE

PROCESS PLANTS

GIRDLER

offers you proven experience in this field

● Girdler construction is now underway on three large plants for ammonia products . . . in Georgia, Maine and Canada. These are typical of many high-temperature, high-pressure process plants, engineered and built by Girdler.

Our experience in this field gives definite proof of outstanding *performance.* We handle all phases of the project . . . coordinate all work to assure on-time construction.

Take advantage of Girdler's proven experience when you start to plan *your* processing facilities. Call our nearest office.

GAS PROCESSES DIVISION... Design, Engineering, Construction of Hydrocarbon Processing Plants, Gas Producing Plants, Chemical Plants.
Offices: New York, San Francisco

VOTATOR DIVISION... Continuous Processing Apparatus for Liquid and Viscous Materials. Design, Engineering, Construction of Edible Oil Plants.
Offices: New York, Atlanta, Chicago, San Francisco

The GIRDLER Company

A DIVISION OF NATIONAL CYLINDER GAS COMPANY
LOUISVILLE 1, KENTUCKY

Bracon . . . SQUEEZE-TO-USE PACKAGING



. . . for the tender touch

Tender hands get loving care when applying Johnson & Johnson's First Aid *Cream*. A gentle squeeze to the pliable plastic tube releases just the right amount to soothe and heal cuts or sore spots.

Johnson & Johnson selected BRACON squeeze-to-use tubes to merchandise their new product because they found women preferred them. In fact, 82% of those interviewed indicated a definite preference for these bright and colorful containers. They found them softer . . . more pleasant to the touch . . . and more convenient from first to last. Here they found the tube that wouldn't crack, leak, roll up *or* dent.

Over three hundred different consumer and industrial commodities are now packaged in the *new* type of container . . . BRACON squeeze-to-use tubes or bottles. Many concerns are filling and sealing in their own plants . . . others use contract packaging facilities.

Why not analyze the merchandising advantages of BRACON squeeze-to-use packaging for your products . . . phone or call for specific information today.



BRADLEY CONTAINER CORPORATION

Maynard, Mass. — *New York, Chicago, Los Angeles*

accuracy, the firm continually calculates "K" from fresh data.

With this formula, Parke, Davis has been able to pinpoint labor requirements, particularly in maintaining coverage during vacation periods. It has also predicted the number of men needed to overcome a work backlog caused by a strike. In the latter instance, by hiring the number indicated by the formula, more packages were processed in a 10-month period than had formerly been done in 12 months. Further, when the backlog dwindled, layoffs were unnecessary; the "extra" personnel were easily transferred elsewhere.

Related and just as significant is the general sharp reduction of "overdue" or backlog orders effected by the formula's use. The finishing division is now operating nearer schedule, and the sales division is certain of sufficient stocks. Additionally, the finishing division can now readily absorb new products into its schedules.

Limitations: Parke, Davis's answer to the ebb and flow of employment demands is not without some boundaries. Some assumptions—such as equating the ratio of planned to unplanned units as determined from delivery reports to a similar ratio in production demand—are not always strictly valid. Switches by the production planning section of unplanned to planned items (and vice-versa) further complicate the situation. And the constant "K" shifts as factors comprising it (new time-off benefits, for example) change.

However, by careful scrutiny and updating of data, the formula is made to work well. And Srigley hopes further research will lead to even more accurate calculation of personnel needs, determination of section demands instead of just departmental demand, and improved coordination of the finishing division with other company functions. Even without these refinements, though, the firm is more than satisfied. Says Srigley: "We believe the formula has practical application in the problem of mechanization versus labor.

"As a management tool, it has a definite use in stabilizing labor requirements, enchancing job security. It has definitely helped us to . . . preserve the sense of high personal pride our people built up in the years of hand production."

Brighter Future For Stainless?

There's a good chance that more stainless steel trucks will be used in hauling of chemical and petroleum in the near future. Reason: the Interstate Commerce Commission—prodded by chemical and oil shippers, as well as by the National Tank Truck Carrier Assn.—may be ready to modify its tank construction design specifications.

Present specifications (MC-300, 303 and 304) pretty much rule out use of stainless steel for building these tanks. They call for a yield strength of 50,000 lbs./sq. in., a point at which stainless will permanently bend.

Present plans lower required yield strength to 30,000 lbs./sq. in. According to NTTC, use of stainless won't mean any sacrifice in safety. Truckers argue that the 50,000-lbs. requirement was set nearly 20 years ago—before need for stainless—as a safety standard for high-tensile steel. This figure is high even for tensile steel, because although tanks must have that strength, they are not subjected to more than 5,000 lbs./sq. in. in actual use.

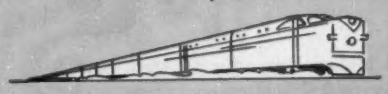
There are several reasons why shippers and tankers want to shift over to use of stainless for tank trucks:

- Primarily, a wider variety of commodities can be carried in stainless steel than in present regular steel and aluminum tanks.
- Stainless equipment is easier to clean. With so many new chemicals on the market, it's becoming increasingly more difficult to combat two big problems—corrosion and contamination of loads. Contamination is prevented by thorough scrubbing of tanks between each load, but this can cause rust. A little moisture trapped behind a baffle plate can be enough to cause rejection of a tank load. Stainless nullifies this problem.
- The big growth in hauling of jet fuels invites the use of more stainless equipment. These fuels are highly corrosive, and cause more leaks in equipment than ordinary fuels. Stainless would obviate this problem, too.
- Truckers are especially disturbed these days by rejection of loads because of contamination. Insurance companies are making it tougher and tougher to collect for such losses. Some companies (e.g., Lloyd's) that specialize in high-risk insurance will insure

WHY CARRY A LARGE INVENTORY?



GET IMMEDIATE SHIPMENT FROM...



Maas

Minimum transportation time from the largest producer with the most complete line of phosphates and photo-pure chemicals in the West.

BUY MIXED CARS FROM MAAS:

ARMOFOS (tripoly) • TRISODIUM PHOSPHATE

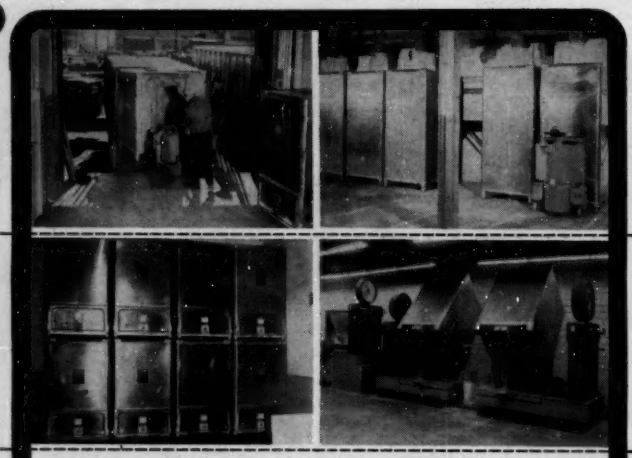
DISODIUM PHOSPHATE • DRI-TRI (anhyd. tsp)

TETRASODIUM PYROPHOSPHATE • MONOSODIUM PHOSPHATE

SODIUM ACID PYROPHOSPHATE

Don't let large inventories be a burden. Write for descriptive folder.

A. R. MAAS CHEMICAL CO.
Division of Victor Chemical Works
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UNEQUALLED ECONOMY and FLEXIBILITY in INSTALLATION and OPERATION

2 good reasons why

TOTE SYSTEM*

has made more BULK INSTALLATIONS than any other concern in the MATERIAL HANDLING field

Tote System is a *complete* bulk materials handling system built around easily handled and transported aluminum containers, plus automatic filling and discharging equipment.

Compared with handling systems based on stationary bins, Tote System is more economical to install. (One user estimated his saving on Tote as opposed to silos and necessary conveying equipment at approximately $100,000.) Tote System is highly flexible —can be readily adapted to changes in plant layout. And Tote System requires no more labor to operate than so-called push button silo systems.

Compared with handling systems using conventional containers, Tote System saves time and labor; container costs; storage costs; losses due to weather and deterioration; losses due to spillage, sifting and dusting; losses due to rodents and insects; original product quality.

Tote System is now being used by hundreds of manufacturers and processors for inter-plant shipment of materials; for in-plant storage and handling; for accurate and automatic weighing and blending.

If you handle bulk materials, why not let Tote System engineers determine, without obligation, the savings you can effect.

TOTE SYSTEM, inc.

820 So. 7th BEATRICE, NEBRASKA

* Tote and *Tote System Registered U.S. Pat. Off.

SALES . . . . . .

against it, but high premiums cut deeply into truckers' hauling profits.

Bid for ICC Approval: Also in the works is a move that may accelerate the adoption of more stainless steel: a proposal that ICC approve construction of equipment with outside stiffeners instead of baffles. The smooth bore interior combined with easy cleaning of stainless would be a big step forward for truckers.

Though ICC approval is necessary for changes in the specifications, its approval would really be somewhat academic. On the West Coast, use of stainless for hauling flammables is fairly widespread. ICC has so far raised no objections—a probable tipoff to how it will act on the upcoming changes in specifications.

If ICC goes along with industry recommendations, there won't be an immediate wholesale shift to stainless steel equipment. Why? Cost. Stainless runs $15,000-20,000 for a regular 6,500-7,000-gal. tank, or about twice as much as a regular steel tank and about $5,000 more than aluminum units. Too, waiting time for the stainless equipment is 3-6 months, and would be even longer if the new recommendations go through.

Consensus, though, is that most would profit by more liberal wording of the specifications. Traffic managers, for example, would have less trouble getting proper equipment to haul chemicals or petroleum; truckers could cut down the number of special types of trucks they must use; insurance companies would have fewer hassles about contaminated loads.

Thus, the case for greater use of stainless steel for hauling chemicals appears to be strong—and ICC may soon concur.

DATA DIGEST. . .

• **Tetrahydrofurfuryl alcohol:** Booklet gives physical data, chemical reactions, uses in plasticizer, herbicide, amino acid, and protective coating chemicals. Quaker Oats Co. (Chicago).

• **Chlorendic (HET) anhydride:** 19-p. brochure of data on chemical and physical properties and specifications suggests uses as hardener for liquid epoxy resins at high temperature, glass-reinforced laminates, casting resins for potting and encapsulation of electrical systems, and heat-resistant plastic tools, dyes, adhesives, and coat-



BOEING 707 JET TRANSPORT, here shown high above the clouds over Mount Rainier, Washington, can be flown to above 42,000 feet and at speeds more than 500 miles per hour.

FIRST FOR TESTED PERFORMANCE!

America's first jet transport to be flown in tested flight, the Boeing 707 is the result of long research, continuing experiment and high technical skill. Esso Petroleum Solvents are equally the product of years of research, development and careful application of advanced technical know-how. You have the assurance of tested quality and character when you specify Esso Petroleum Solvents. For detailed information, write or call: Esso Standard Oil Company, Solvents Division, 15 West 51st Street, New York 19, N. Y.

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RESEARCH AND EXPERIENCE DEVELOPED THE FINE CHARACTER OF ESSO SOLVENTS



HILLS-McCANNA

OS and Y Valve

DEPENDABLE PROTECTION FOR HAZARDOUS SERVICES

NOW available from stock in commonly used sizes

Use the Hills-McCanna OS and Y Valve in These Tough Services

Acetic Anhydride
Carbon Disulphide
★ Chlorine (Dry)
Fuming Hydrochloric Acid
Fuming Nitric Acid
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★ Hydrogen
★ Hydrogen Cyanide
Hydrogen Peroxide, conc.
Illuminating Gas
Lacquer Thinner
Lead Tetra Ethyl
Monochloro Acetic Acid
Nitro Glycerine
Oxygen
Phenol (Hot)
Pyridine
Steam

Now you can combine the corrosion resistant characteristics of the Hills-McCanna Saunders principle with the dependable protection of a sealed bonnet and packed stem for handling hazardous or toxic liquids and gases.

Just check these features of Hills-McCanna OS and Y valves: Back seating stainless steel stem slides in adjustable Teflon packed stuffing box with stainless steel gland . . . operating sleeve isolated from material being handled . . . equipped with "try port" to test for leakage . . . choice of cast steel or stainless steel bonnet assemblies . . . wide choice of alloy, plastic or lined bodies . . . choice of rubber, synthetic or plastic (including Teflon) diaphragms.

Hills-McCanna OS and Y valves are available from stock in ½", ¾", 1", 1½" and 3" sizes, 2½", 4" and 6" sizes are available to order. Write today for full information outlining the nature of your service. HILLS-McCANNA CO., 2445 W. Nelson St., Chicago 18, Illinois.

HILLS-McCANNA

saunders patent diaphragm valves

Also Manufacturers of:
PROPORTIONING PUMPS
FORCE FEED LUBRICATORS • LIGHT ALLOY CASTINGS

SALES . . . . . .

ings, Hooker Electrochemical Co. (Niagara Falls, N. Y.).

• **Hydrogen peroxide:** 21-p. booklet describes chemical reactivity, physical properties, handling and specifications. Applications are suggested in paper and textile bleaching, chemical synthesis, polymerization catalysis, and in increasing porosity of rubber and structural materials. Solvay Process Div., Allied Chemical & Dye Corp. (New York).

• **Polymer cement:** 20-p. brochure furnishes information on use of Paracril nitrile rubber polymers in solvent cements where oil resistance is desired. Properties, cement preparation and storage, compounding, and several formulations are included. Naugatuck Chemical, Div. of U. S. Rubber Co. (Naugatuck, Conn.).

• **Luminescent pigments:** Booklet gives data on characteristics and applications of Violite phosphorescent and fluorescent pigments. Rhode Island Laboratories (West Warwick, R. I.).

• **Metallurgical carbon:** Bulletin describes physical and chemical characteristics of carbon for metallurgy, tabulates available grades, mesh sizes, volume per pound and analysis. Barnebey-Cheney Co. (Columbus, O.).

• **Teflon packings:** Folder describes split and folded types of envelope and solid gaskets, stuffing box, Vee-Flex, braided, plastic and other types of valve stem packings. Raybestos-Manhattan, Inc. (Passaic, N. J.).

• **Air shipment:** Pocket-size booklet gives tips on how to ship by air in corrugated boxes. Hinde & Dauch Co. (Sandusky, O.).

• **Truck emblems:** Brochure describes types of decals that are available for trucks. Meyercord Co. (Chicago).

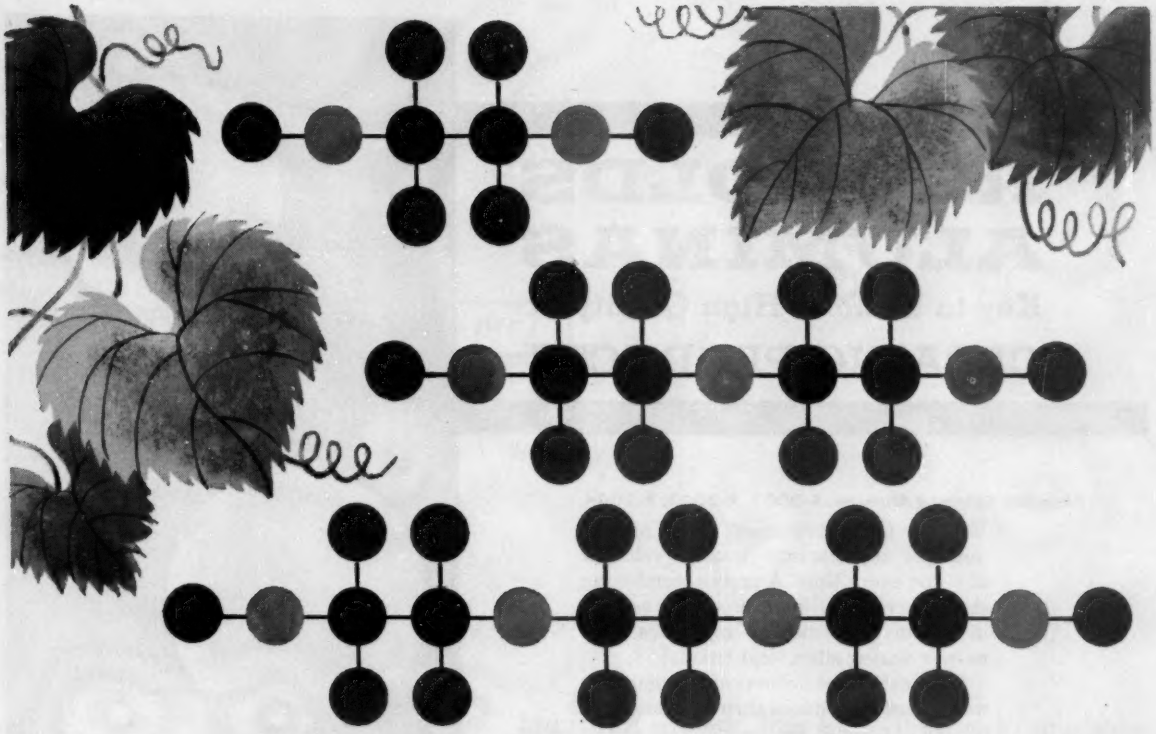
• **Electric trucks:** 16-p. catalog delineates electrically driven industrial trucks. Automatic Transportation Co. (Chicago).

COMPETITION. . .

• Chemstrand Corp. has opened an office in Akron, O., to sell nylon and acrylic fibers.

• Polymer Corp. of Pennsylvania (Reading) has located a warehouse and sales office in New York City.

• Allied Chemical's Solvay Process Division has added an organic chemicals section to sell chlorinated organics.



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when you process with

JEFFERSON

ethylene
diethylene
triethylene | **Glycol**



Used extensively as softening agents because of their excellent hygroscopic properties. They are capable of absorbing almost twice their weight of water at room temperature and 100 per cent humidity. Being dihydric alcohols, these glycols react with polybasic acids to produce polyester materials.

They are completely miscible in water, yet dissolve many organic chemicals. In soluble oils, the glycols function as coupling agents between fatty acids and soaps, producing more stable emulsions.

Let our Technical Service staff advise you on the handling, storage and uses of Ethylene, Diethylene and Triethylene Glycol. Available in tank cars, drums, or samples for your investigation. **Jefferson Chemical Company, Inc., Box 303, Houston 1, Texas.**

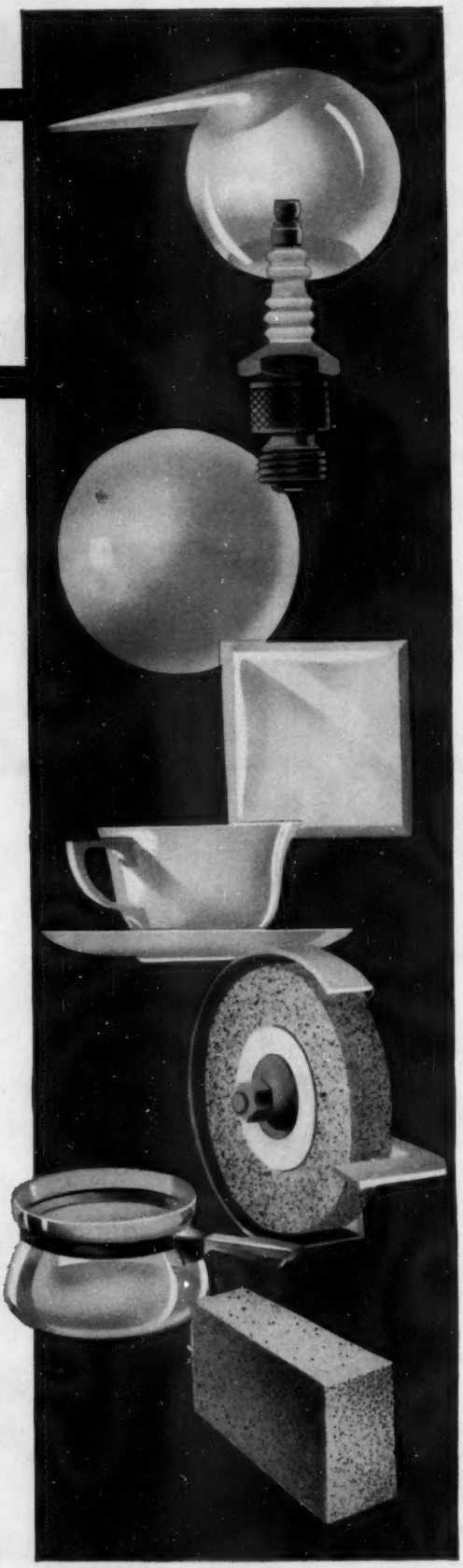
Essential Chemicals from Hydrocarbon Sources

Jefferson
CHEMICAL COMPANY, INC.

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REYNOLDS ALUMINAS

Key to Uniform High Quality in CERAMIC PRODUCTS



Reynolds Calcined Alumina, R-2002, R-2003, R-2004

You pay the metallurgical grade price—you get top ceramic quality calcined alumina every time. A process combining the Bayer and Sinter processes assures minimum quantities of impurities such as iron oxides, silica, and titania.

Extremely low chemically combined water content reduces shrinkage and distortion of finished products.

Reynolds Calcined Aluminas provide improved thermal shock resistance, higher refractoriness, better appearance for such products as glass tank refractories, ceramic tile, abrasives, laboratory wave and heat resistant glassware.

Reynolds Hydrated Aluminas, R-5002, R-5003

Obtain uniform high quality for sagger wash, mold coatings and dusting of kiln furniture. R-5002 and R-5003 assure maximum rate of reactivity when treated with acids or bases. High solubility and purity protects the quality of end products. Their snow-white color enhances the appearances of finished products.

Product Data Sheets on these aluminas are available. Samples for testing will be provided. Call the nearest Reynolds Office, listed under "Aluminum" in your classified telephone directory, or write *Reynolds Metals Company, P. O. Box 1800-CM, Louisville 1, Kentucky.*

See "FRONTIER", Reynolds exciting dramatic series, Sundays, NBC-TV

The Finest Products Made with Aluminum are made with REYNOLDS ALUMINUM

REYNOLDS METALS COMPANY



Industrial growth, like human growth, is a sign of health. But, unlike the latter, it can be directed — directed into paths that best serve a company's long-term interests. This fact seems to have escaped many chemical executives, whose companies have traditionally developed along the path of least resistance. But — profiting from the lessons of a decade of rapid industrial expansion — management men in all areas of industry are awakening to the need for more planning in this field.

Here, distilled from the long experience of a well-known management consulting group, is . . .

Richard L. Bolin and Richard F. Messing

A Better Way to Plan Your Company's Growth

Story begins on p. 70 ►

IN WOOD FLOUR UNIFORMITY DOESN'T JUST HAPPEN

Wood flour is usually a high percentage of the finished product. But it's a *small* percentage of the *value* of the product. So quality and uniformity are the prime considerations in wood flour.

The new Wilner wood flour mills were engineered to provide the highest precision and automation in processing control. The plants are so completely automatic, they could be operated by pushbutton from the president's office. Continuous moisture and rotap testing guarantees that the flour, once tailored to the mix or formulation, never varies. The user is assured of wood flour milled from kiln-dried, clear white pine, free from contamination, with a low moisture content, and in any mesh size desired.

Typical Analysis
140 Mesh Wood Flour

Thru	On	
	100	trace
120		99.2
140		96
170		86
200		75.6
270		49.2

Among the users of Wilner Wood Flour

ARMSTRONG CORK CO.
BIRD & SON
BONAFIDE MILLS, INC.
GENERAL ELECTRIC CO.
ROHM & HAAS CO.
STANDARD TANK & SEAT CO.

For samples, further information and specifications, please write:

DEPT. N-2D

Wilner Wood Products Co., Norway, Me.

C W Report

TO STAY abreast of competition, broaden their operational base, level off financial peaks and depressions, break out of a particular economic cycle, or for any of a number of other reasons, chemical companies in wholesale numbers last year engaged in some type of diversification.

As in the past, much of this activity took the form of mergers. Over the last 10 years, the chemical industry has led all other industry groups in acquisition of outside firms. Chemical names predominate among the 25 firms that lead the field in the number of acquisitions they have made (*CW, May 28, '55, p. 14*).

But hardly a week goes by that some chemical process company isn't expanding capacity, integrating, or engaged in any one of several other means of diversifying.

Often, these critical corporate ventures are based on inadequate planning. Is it any wonder that more than one top executive has later found that the result is disappointing?

On the following pages is described

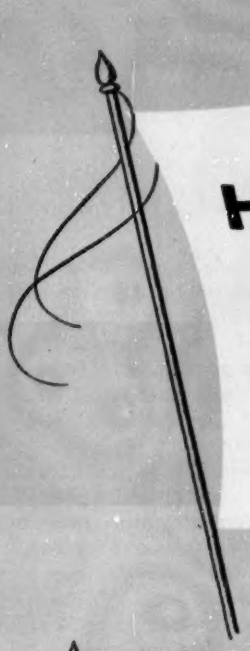


Meet the Authors

CHEMICAL ENGINEERS Richard Messing (left) and Richard Bolin work together at Arthur D. Little, Inc.'s Industrial Economics Dept. Out of their experiences with ADL clients in the process of expansion came most of the background for this report. Growth problems within ADL provided the rest.

MESSING took his B.Ch.E. at University of Minnesota in 1943, did graduate work the following year at Illinois Institute of Technology. He served as a research engineer with the Office of Scientific Research & Development before joining ADL in 1945. He is now manager of the firm's Industrial Economics Dept.

BOLIN was an undergraduate at Texas A&M, took his M.S. at Massachusetts Institute of Technology. Between degrees, 1947-49, he worked for the experimental and testing division of Humble Oil & Refining Co. He joined ADL in 1950, starting, like Messing, with the company's Chemical Market Research group.



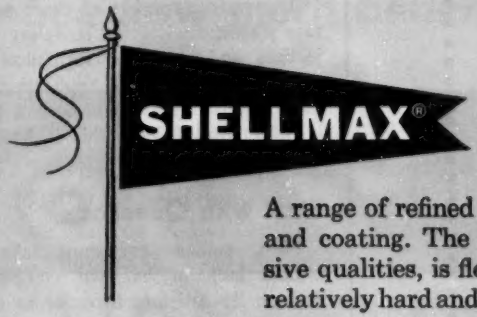
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a systematic approach to growth through expansion and diversification. The system doesn't obviate the need for decision by management, but it does help place decisions in this area on a scientific basis. And, too, this organized approach to corporate growth can:

- Substantiate management's thinking about vague expansion possibilities, thereby permitting management to be more certain of its own position.
- Uncover unforeseen growth opportunities.
- Give a company some idea of the risk involved in a projected diversification—by providing a measure of the gap between growth opportunities and the company's qualifications to fulfill them.
- Help management make long-range plans for research, production, personnel, plant sites, and other functions concerned with expansion.
- Chart a company's position in its operational fields, enable management to move quickly on opportunities that may arise.

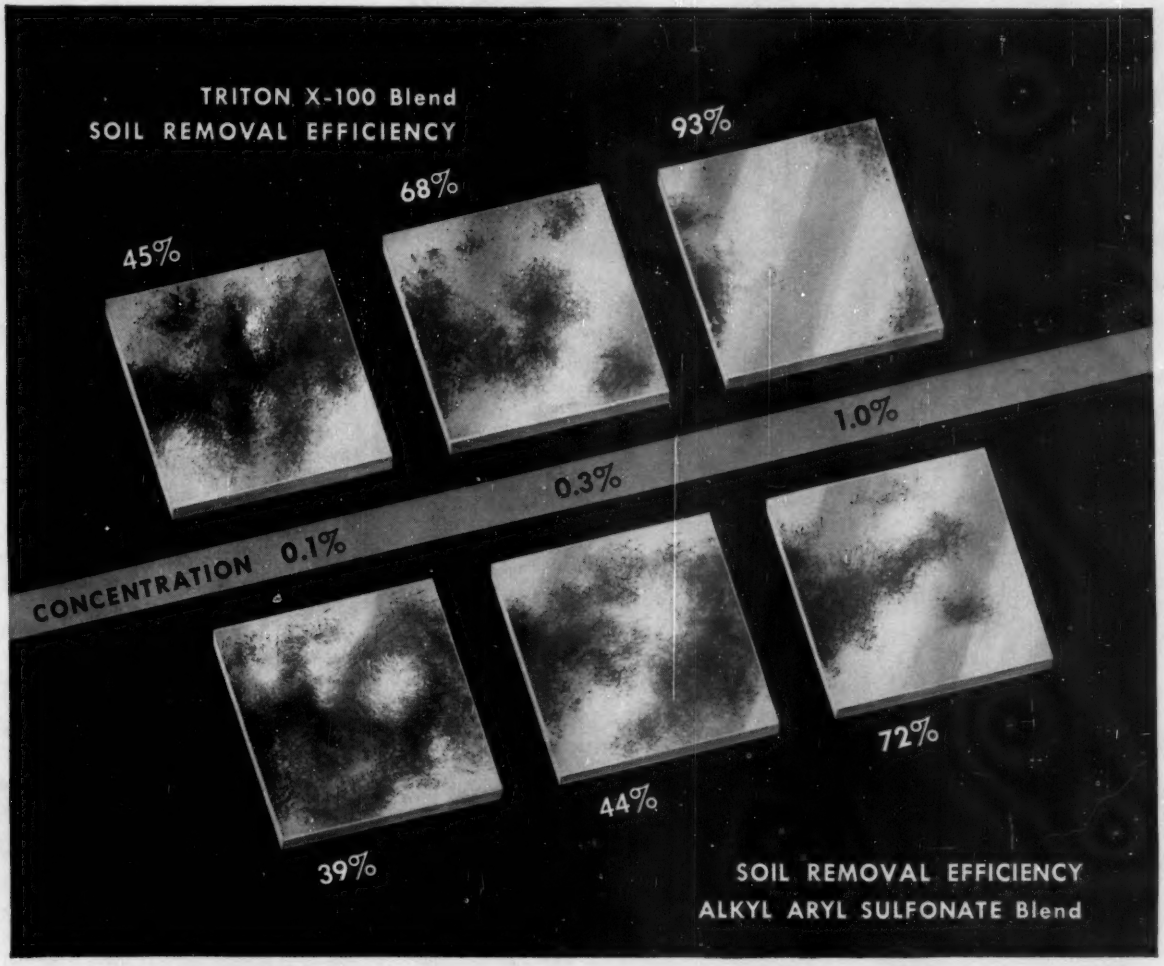
The system consists of three separate stages: analysis of company objectives and strengths; formation of expansion criteria, and application of these criteria. Its most important tool is objectivity. Briefly, this is how it works:

Start with Questions

First, management must take a critical look at its own company, division by division, in order to discover its strengths and weaknesses—both of which must be taken into account in growth plans.

It must dig into its own executive staff, to search out hidden capabilities, experience in other industries, and even attitudes among top management. Matters such as these are important: they can either expedite or derail expansion plans. In addition, management must ask itself certain incisive questions (*see box: Twenty Questions*).

The answers to these questions will



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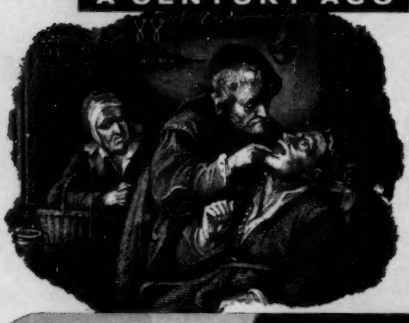
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start a company in the right direction and, possibly, even suggest definite avenues for diversification and growth.

Example: An oil company finds its basic strength lies in the understanding and appreciation of the risks involved in the exploration and development of mineral resources. This immediately suggests expansion into other mining ventures such as uranium.

Elementary? Perhaps—but elementary principles are not always easily apparent.

Most important, the answers to these questions serve as a three-sided yardstick against which growth objectives, company strengths, and the requirements for successful expansion can be correlated.

At this point, each of these factors is individually considered, listed in a table of expansion criteria (*see box: Yardstick for Growth*) and weighed relative to the other factors. Numerical values assigned to each factor help show the relative importance of the different factors influencing a potential expansion or diversification.

Complete objectivity and critical analysis are most important, of course, in deciding, first, the criteria to make up the table and, then, the maximum values for each.

How to Narrow the Field

Application of these criteria is the next step. Different industry groups and segments are selected as possible expansion areas and rated against the table of expansion criteria.

Initially, management must scan only the broadest industrial groupings —e.g., textiles, mining, metallurgy, etc. Many of these major areas can be eliminated quickly. Next, management subdivides the surviving areas —metallurgy, for example, into ferrous and nonferrous—and rates each segment. Ultimately, the original broad grouping will be broken down into specific products, such as zirconium, tantalum, etc.

Here's an example illustrating how

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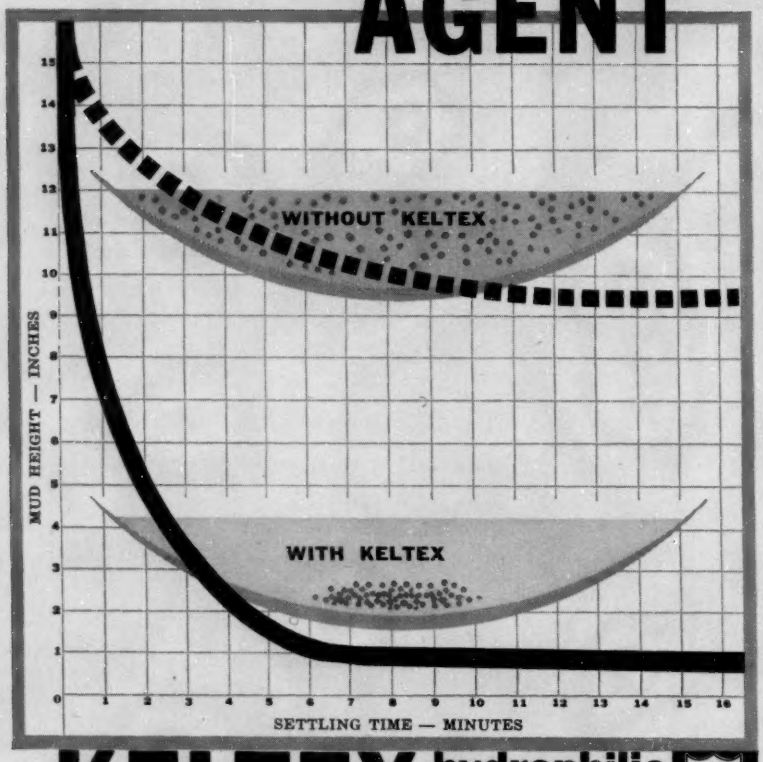
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the table of growth criteria would be used:

> **A company is considering the desirability of going into the specialties business. Production of specialty "A" requires only a modest knowledge of complex organic synthesis. Let's assume that organic synthesis knowhow has a top rating of 5 on the table of criteria. In this instance, then, management might assign item "A" as low as 20% of the maximum allowable rating or 1.**

The form taken by this rating procedure is a table (*see box: Expansion Handicaps*); the objective is a "nearness-to-ideal" rating for each growth area under consideration. This "nearness" factor indicates just how close each item comes to fulfilling principal growth objectives while utilizing existing company strengths.

With these "nearness" factors before it, management then selects the top 10-20% of the rated items as the best avenues to growth. Each item is carefully considered to arrive at the one that is most suitable.

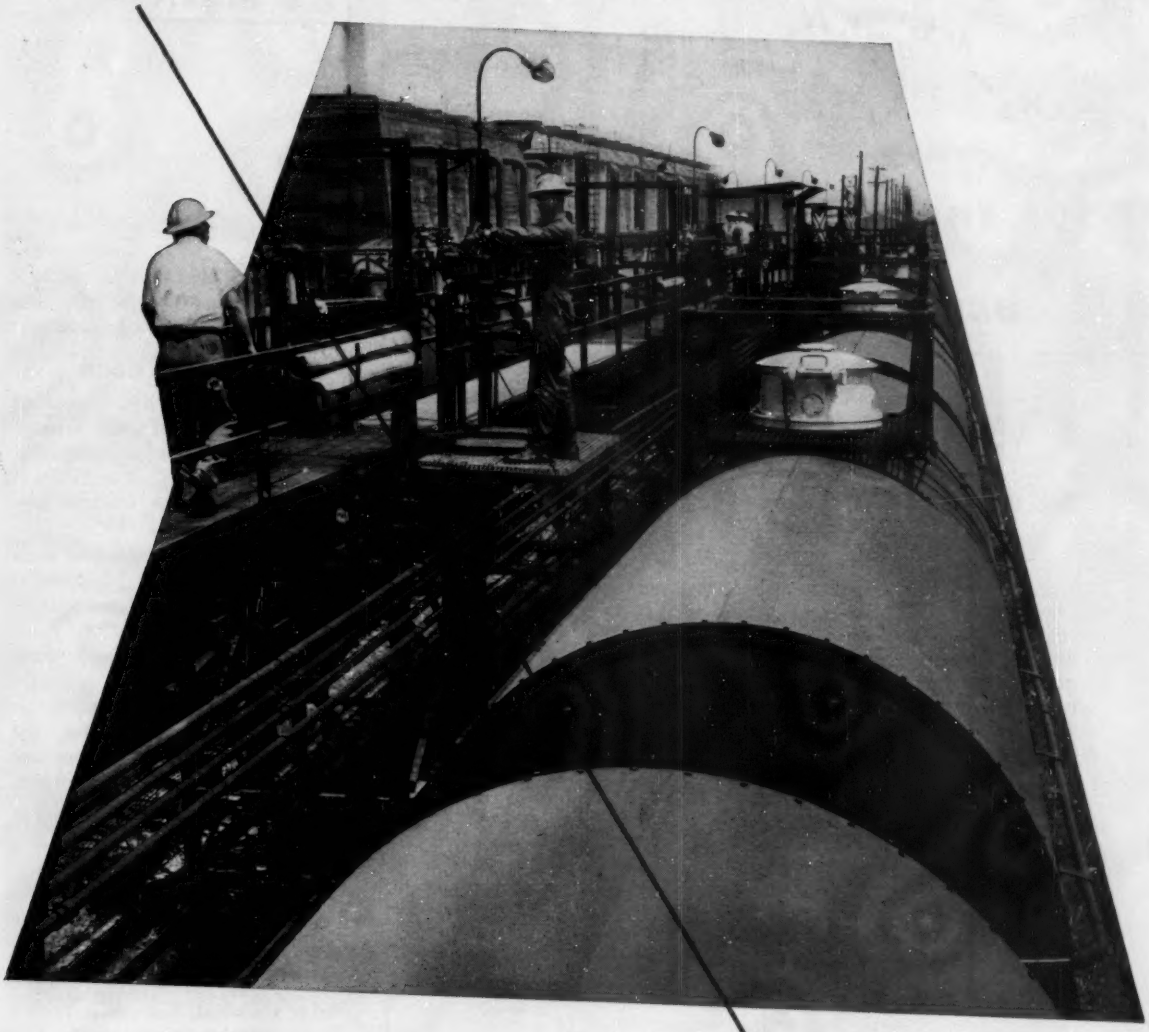
In its deliberations, management must ponder other factors, as well. It must, for example, combine the "nearness" factors with the projected growth and profitability of the different items under evaluation. But such factors as growth and profitability, in preliminary consideration, at least, may be defined and used on a rough comparative basis: high, low, or medium.

The major premise throughout this article is that a company is more likely to grow successfully if it grows through strength. But sometimes growth objectives run counter to strength, demand expansion through weakness.

> **Case in point: A company has heavily concentrated its sales in one industry. To avoid complete dependence on this industry, the company wants to go into an entirely different field about which it knows practically nothing.**

In such cases, it is essential that management critically examine and

soon there'll be more



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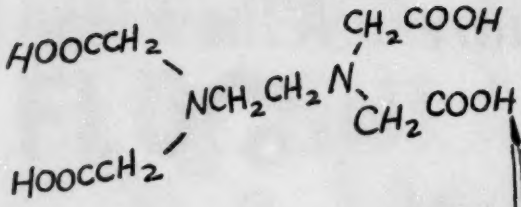
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re-examine its objectives in the light of possible disadvantages that can result from growth against strength.

Now—the Right Road

Once management has decided on its destination, it must select a route. Four principal paths to diversification are open:

1. Entry into new markets with present products.
2. Addition of products now made by other firms.
3. Addition of new products developed by research.
4. Acquisition of a going concern or plant.

There are, of course, variations on these basic approaches. Too, for optimum results, two or more approaches may be used simultaneously.

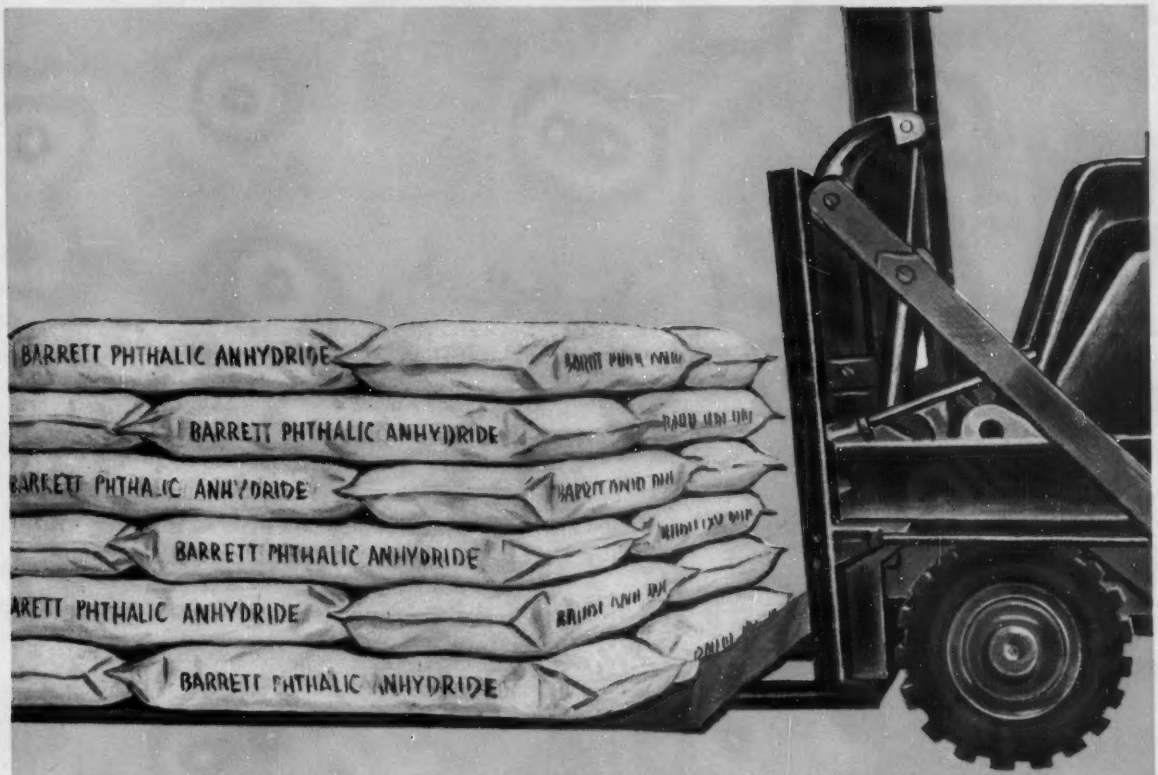
Vick Chemical, since 1933, for instance, has based its growth on all four: (1) entry into the Philippines, (2) addition of reagent-grade aluminum hydroxide, among other established products, (3) introduction of a tranquilizing drug, among other new products, (4) acquisition of going businesses —e.g., Extruded Plastics, J. T. Baker Chemical, and others.

Each alternate route merits fine scrutiny and careful reflection. Here are some important considerations:

Entry into new markets is generally desirable and advantageous. Established product technology and manufacturing experience immediately give the expanding firm a strong competitive one-two punch. Here, the goal is greater sales for established products. The means are two-pronged: creation of new applications and development of virgin geographical markets. Management's quest for new markets should, of course, be a continuing one.

This is, perhaps, the most difficult road to growth, but it is also the safest.

Manufacture of products in competition with established lines of other firms can be justified only when the



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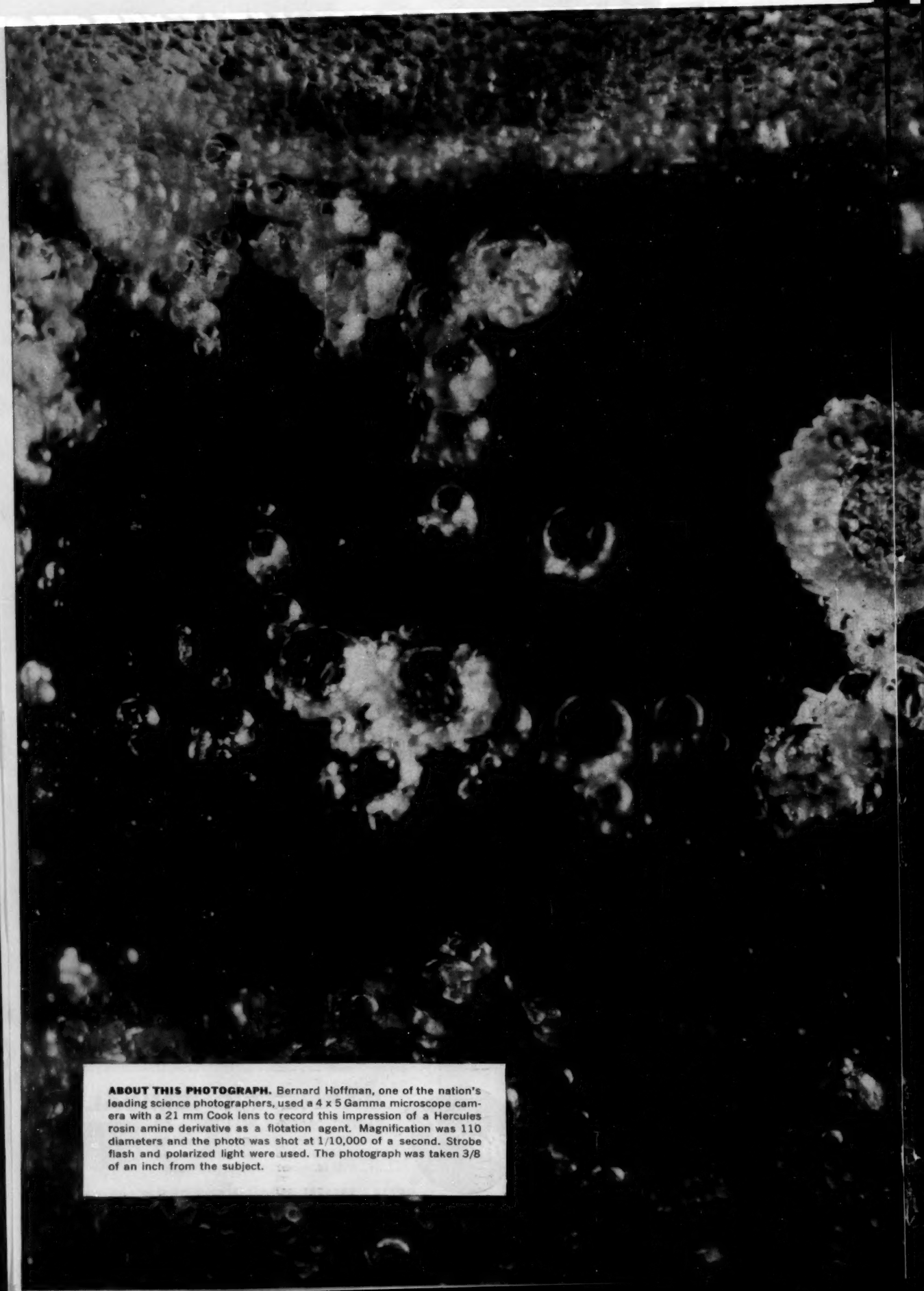
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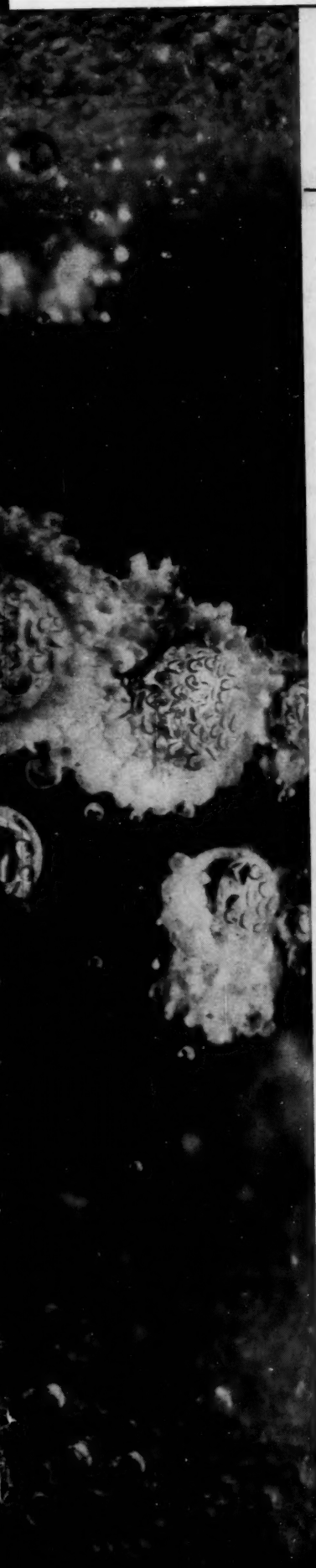
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Twenty Questions to Answer

1. What experience has your firm's management had in other industries?
2. Is management liberal or conservative?
3. Does management usually deal in small or large sums?
4. How much of a risk is management willing to take?
5. What capital is available for diversification and subsequent expansion, if required?
6. What return on investment is expected?
7. What is credit policy?
8. How fast is money turned over in the present business?
9. What raw materials are now present or readily available?
10. Does the company have a strong purchasing position?
11. Are present production personnel many or few? Skilled, semiskilled or unskilled?
12. Are present production personnel or techniques adaptable to a new venture?
13. Will present plant location prove of any possible value in proposed expansion?
14. What process and product patents and know-how are available?
15. In what areas of technology is the company now proficient?
16. In what fields of the physical sciences is the company knowledgeable?
17. Which company markets can be further exploited? How?
18. Is selling now aimed at a few industrial consumers or at a large number of retail houses?
19. How important is technical service?
20. Exactly what does the company hope to gain through expansion?

C W Report

expanding firm enjoys a preferred position by virtue of captive markets, or an especially strong sales position.

Profit possibilities in addition of products now made by other firms are generally low. The hazards are high. This route demands the most critical consideration.

Addition of new products developed by research is a longer and more hazardous route to diversification than the others, particularly for the smaller company. A company with a small research budget must put all its eggs in one basket, concentrate its research effort in a relatively limited area. Unlike a big organization, the small firm cannot lay off its money on many projects, thus minimize the risk of a fruitless effort in any one of them.

Growth through research offers a company the advantage of a unique product on which it might reap substantial profit. But this must be kept in mind: the small firm often does not have enough money to carry a new product through to commercialization.

Acquisition, perhaps, is the most popular way of diversifying in the CPI or, at least, the one that has received the most attention. This route to expansion has many advantages:

(1) It quickly broadens the scope of the acquiring company.

(2) It provides established sales positions in new areas, bypassing the relatively high sales development costs associated with introducing new products developed by research.

(3) It provides new technical and administrative talent, which often benefits operations of both firms.

(4) Prospects for an acquired company often can be analyzed more accurately than those for a new product from research.

(5) Acquisition can be as profitable as building new facilities for established products and, in a crowded field, does not unbalance the supply-demand situation by creating new capacity.

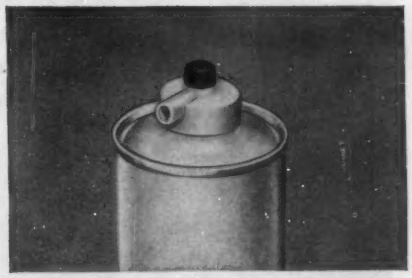
On the other hand, financial return on an acquisition often is less than that of a unique product developed by research. And organizational and personnel changes involved in acquisitions are complicated, time consuming, and sometimes unpleasant. Competitors often are able to take advantage of such temporary disorganization to enhance their own sales positions.

But the most important factor

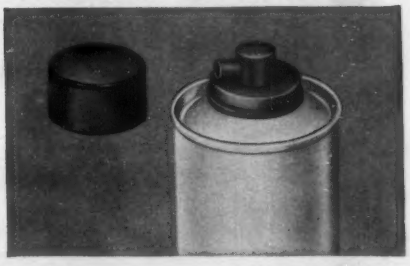
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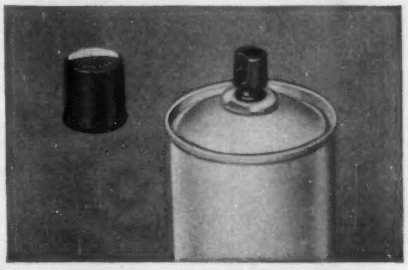
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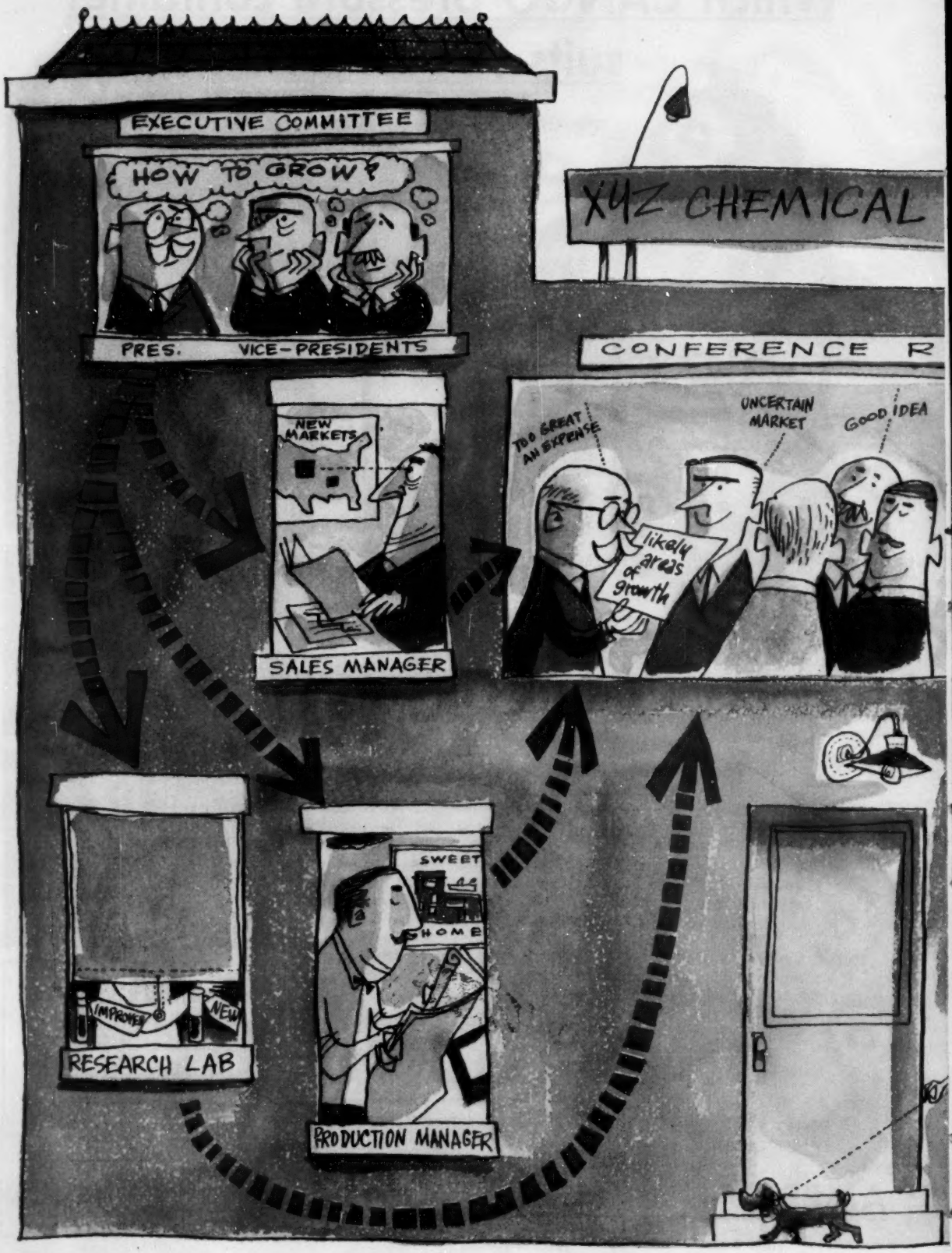
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Intelligently applied, this systematic approach to growth can facilitate the planning of expansion on all scales—from adding a new product to diversifying the activities of an entire corporation.

Here's how the system would be used by a small dye manufacturer. It wants to expand, yet avoid further concentration in the textile industry.

A careful analysis of company strengths (*see table: Character Analysis*) shows that selling is the firm's strong point, that relations with textile companies are excellent. Because management wants to avoid further dependence on textiles, this means that the company will have to grow against strength, not through it.

Growth Gauge: Now management sets up a table of diversification criteria, selecting the different key characteristics of the company and rating their relative importance.

Since the objective of breaking away from the textile field is the strongest factor, it is assigned the maximum value of 10 (*see table: Yardstick for Growth*). Company strengths are then assigned values that reflect the importance management sees in them.

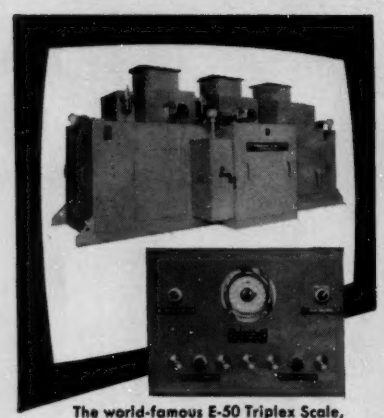
Dope Sheet: The next step is simply checking broad industrial areas against the table of criteria. Such classifications as furniture and transportation equipment can be eliminated quickly. On the other hand, some classifications, particularly the process industries, merit further analysis and closer scrutiny.

The first reduction is into broad categories such as petrochemicals, dyestuffs, minerals, rubber chemicals. Further breakdowns and repeated checking reduce the possible expansion areas to, say, nine product groups (*see table: Expansion Handicaps*).

The next step is more difficult, involves the weighting of each product group against the growth criteria. The expansion team must estimate what part of the maximum rating assigned each characteristic on the table of growth criteria is allowable for each growth area under consideration.

On the table of criteria, for example, sales and technical service—a strong point of the company—is rated relatively high, given a maximum value of 7. Two growth areas under consideration are abrasives and pharmaceutical intermediates. Sales to the former involve only a modest degree of technical service, so abrasives are rated at only 4/7 or 4 of the possible maximum value of this particular item. Selling to manufacturers of pharmaceutical intermediates, on the other hand, involves a high degree of technical service, and so pharmaceutical intermediates are rated at 6/7 of possible maximum.

Expansion Scoreboard: After all growth possibilities are thus rated with respect to each growth criteria, the ratings are totaled to give a "nearness" factor for each product group under consideration. This factor tells management just how close each group comes to the ideal. Management, of course,



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Character Analysis

MANAGEMENT:
Strong in sales activity, understand importance of reciprocity.

FINANCE:
Limited capital available for diversification; expect 10% pretax earnings on sales.

RAW MATERIALS:
All purchased from chemical houses, good purchasing relationship.

PRODUCTION:
Batch operation, high purity requirement, labor is high proportion of cost.

SALES:
Dominant company strength. Relation with textile companies excellent. Minor position in food colors sales to food processors. Industrial selling only, no knowledge of retailing. Strong on customer service.

TECHNOLOGY:
Bulk of small research budget spent on organic chemical synthesis. Development group is predominantly active in new formulations and maintenance of quality. Relatively unfamiliar with inorganic chemical technology.

Yardstick for Growth

	Maximum Rating
1. Are sales to the textile or food processing industries involved?	10
2. Does selling involve a high degree of technical service?	7
3. Can a successful operation be achieved with small capital investment?	7
4. Does manufacture involve high value added?	6
5. Are requirements for close control and purity high?	6
6. Is production on a batch basis?	5
7. Is complex organic synthesis involved?	5
8. Is research support important?	4
TOTAL	50

must combine this factor with others not taken into account, such as projected profitability before making final decisions.

Despite its shortcomings, this table of ratings can be a definite boon to management in its decision making. It not only narrows the field in which management must decide, but also gives management solid information on which to base its decisions. Too, and just as important, by balancing criteria and putting this balance on paper, it often points up growth opportunities that might otherwise be overlooked.

On first glance, for example, the field of powdered metals did not make any impression on the dye manufacturer. Approached systematically and rated against the growth criteria, it showed itself the prime growth possibility.

On this and the following page are charts and tables that record the step-by-step progress toward this unlikely result.

Not shown is the process's crucial last step—the method by which "powdered metals" with a "nearness" rating of 39 (out of a possible 50) are given precedence over "pharmaceutical intermediates" (49) and "flavor and perfume chemicals" (48).

This is the area in which no system can take over for experience and knowledge of business conditions as they exist.

Powdered metals got the nod, because the drug firm's management had ascertained that it offered the best opportunities for further growth. •

Neville Announces Nevastain A



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Expansion Handicaps

	Maximum	Abrasives	Detergents	Explosives	Flavor & Perfume Chemicals	Pharmaceutical Intermediates	Plastics Materials	Powdered Metals	Textile Chemicals	Water-Treating Chemicals
Avoids selling to the textile industry	10	9	5	10	10	10	10	10	0	8
Selling involves a high degree of technical service	7	4	4	4	6	6	4	6	6	4
Successful operation can be achieved with small capital investment	7	2	3	0	6	7	1	5	6	4
Manufacture involves high value added	6	3	3	3	6	6	5	5	6	3
Requirements for close control and purity are high	6	3	3	5	6	6	4	5	5	3
Production is on a batch basis	5	4	4	4	5	5	2	5	4	3
Complex organic synthesis is involved	5	0	1	2	5	5	3	0	4	0
Research support is important	4	4	2	2	4	4	2	3	3	2
Nearness Factor	50	29	25	30	48	49	31	39	34	27

C W Report

to watch is the anti-merger tempest brewing in Washington. The possibility of litigation is a strong deterrent to acquisition.

These, of course, are not all of the pros and cons to consider before selecting a specific expansion route. Once the selection has been made, this system reduces the problem to a simple (but thorough) appraisal of whatever companies are available in the pertinent fields.

Who and How Long

Depending on the size and diversity of a company's business, it generally takes 2 to 10 months to analyze strengths, synthesize criteria, and apply the ratings. After the major areas of interest are selected, some further study is needed to reach recommendations for specific action.

In selecting personnel to carry out the study, management can look either to its own staff or to outside consultants. In either case, those carrying out the study should have relatively broad industrial experience. Too, they must have access to all levels of management.

When the work is carried out by company personnel, it should take little time to analyze company strengths, but considerably longer to determine the strengths required by outside industries. Just the reverse may be expected if the study is made by a consultant.

This systematic approach to growth is not intended to be a complete blueprint for diversification. At best, it



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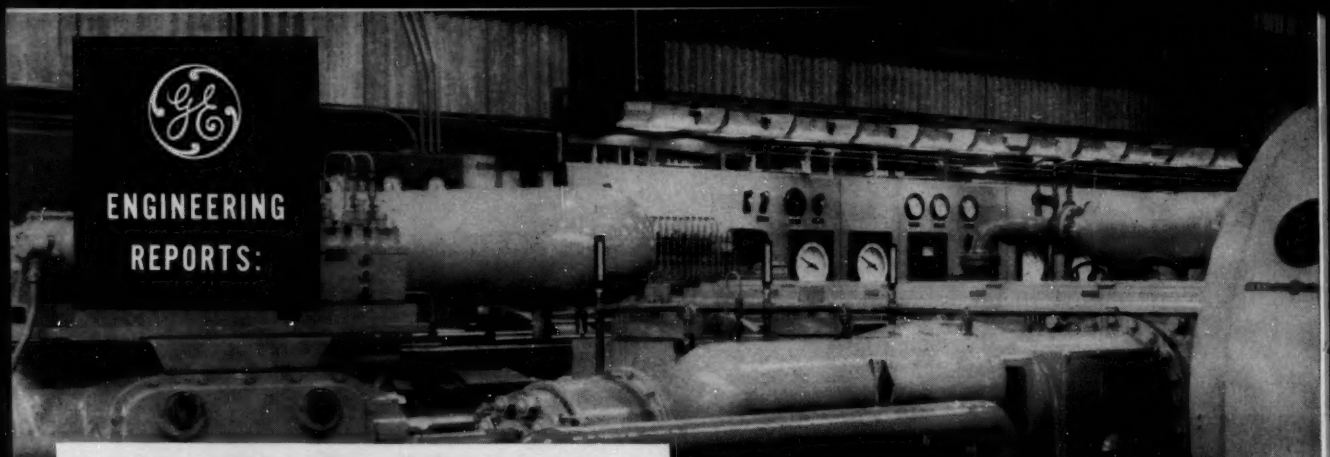


Blockson Plant . . . Joliet, Ill.

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- Sodium Polyphos (Sodium Hexametaphosphate) (Sodium Tetraphosphate)
- Trisodium Phosphate, Crystalline
- Trisodium Phosphate Chlorinated
- Trisodium Phosphate, Monohydrate
- Disodium Phosphate, Anhydrous
- Disodium Phosphate, Crystalline
- Monosodium Phosphate, Anhydrous
- Monosodium Phosphate, Monohydrate
- Sodium Acid Pyrophosphate
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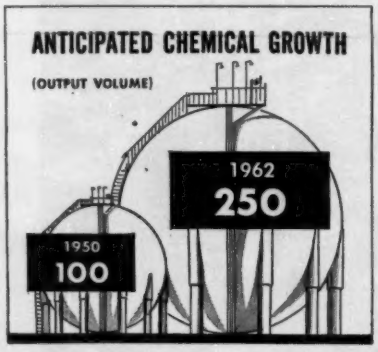


VICE PRESIDENT and plant manager J. G. Carriere (standing), discusses plant features with General Electric's H. F. Hemker, Grace Plant Superintendent Charles Dougherty, and G-E Service Engineer John Thrithart.

Grace Chemical* Installs Prepare New $20,000,000

General Electric Engineering Services helped Grace Chemical design, install flexible electrical system to handle present and future power loads

*Grace Chemical Co., division of W. R. Grace & Co.



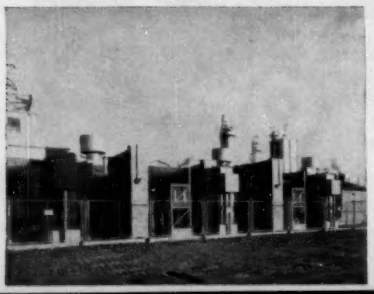
BY 1962, it is expected that the chemical industry will more than double 1950 production levels. In graph, 1950 production equals 100.

Source: *Manufacturing Chemists Assoc.*

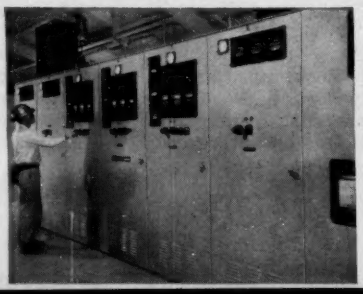
PLANNING NOW for future production is a major consideration in the fast-growing chemical and allied products industry. This booming industry is growing at the rate of about 7% per year (all industry growth averages only 3%) and the annual value of chemical products is now over 7% of the value of the nation's entire manufacturing output.

THE GRACE CHEMICAL COMPANY, a division of W. R. Grace & Co., anticipated growth and constructed the new ammonia-urea plant at Memphis, Tenn. Now in operation, the plant, described as one of the most modern in the industry, has an engineered electrical system that was planned to meet present

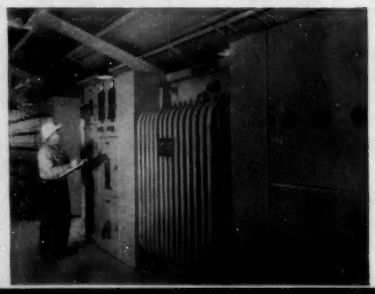
INCOMING POWER is "stepped down" by three G-E 7500-kva, three-phase, power transformers in the main substation. Whole plant uses grounded neutral system.

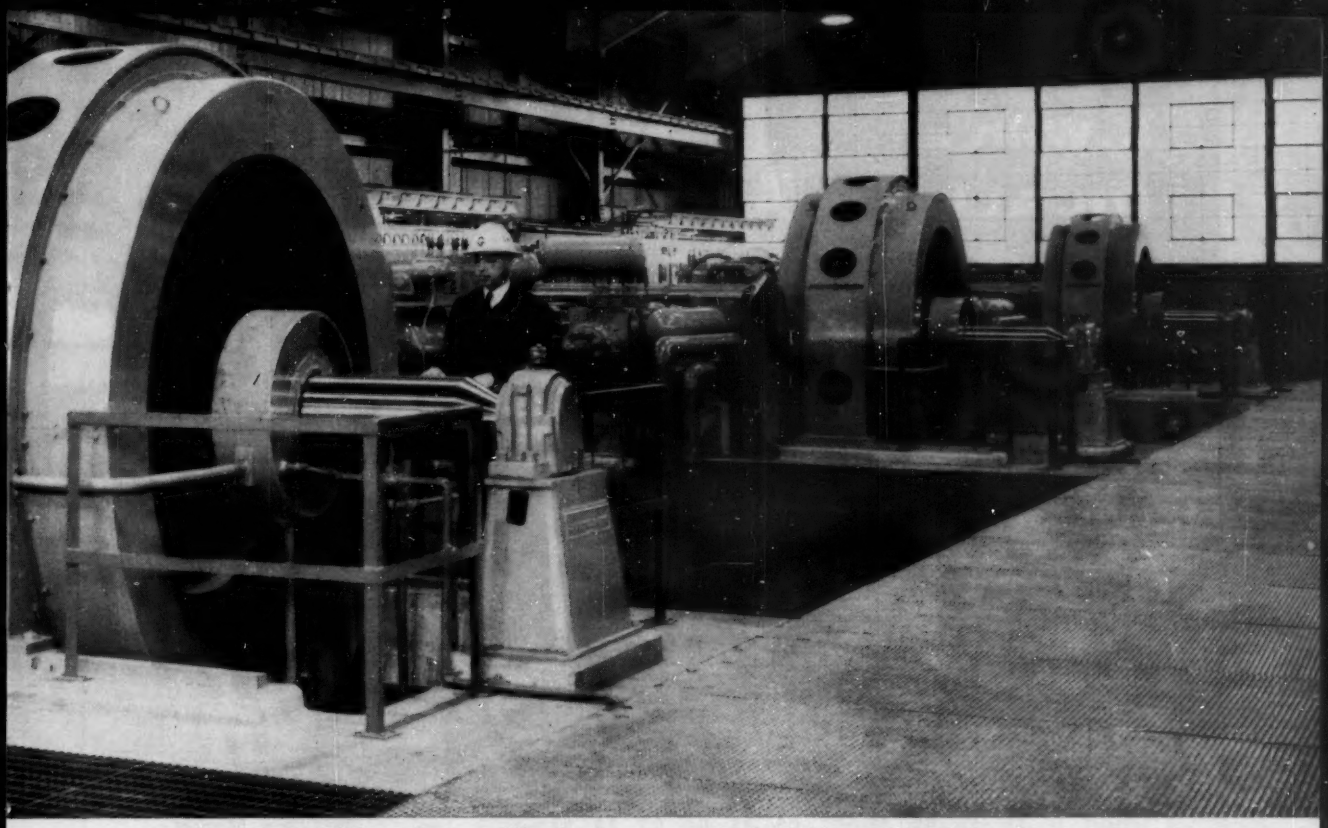


COST SAVINGS and operating convenience were obtained by locating 12,500-v, switchgear (below) inside, transformers (photo at left) outside the powerhouse.



POWER is stepped down to 480 volts for the plant's process drives by this 1000-kva load-center unit substation, one of four installed in the plant.





ONE OF THE OLDEST industrial chemicals, ammonia, has found new uses in synthetic fibres, vitamins, rocket and missile fuel, and various chemical intermediates. In Grace's modern process, three huge 3000 hp G-E motors drive Ingersoll-Rand gas compressors.

Engineered Electrical System to Help Plant for Rapid Industry Growth

production requirements yet flexible enough for future expansion.

Cornerstone for expansion is the electrical system—designed and installed with the help of G-E engineering. A G-E service team headed by W. A. Raines, Manager—Industrial Sales, N. Y., and H. F. Hemker, Manager, G-E Memphis Office, worked closely with the Foster Wheeler Corp., main contractors, and Grace Chemical personnel to design and install the G-E electrical equipment that met the Grace requirements.

VICE PRESIDENT JOHN G. CARRIERE of the Grace Chemical Co., Plant Manager of the new installation, summed up a discussion of the plant facilities with these words . . . "G-E engineering services did an excellent job for us; the electrical system has performed superbly."

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†Registered Trademark of General Electric Co.

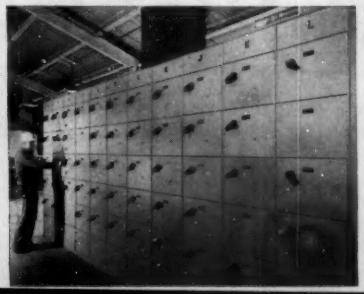
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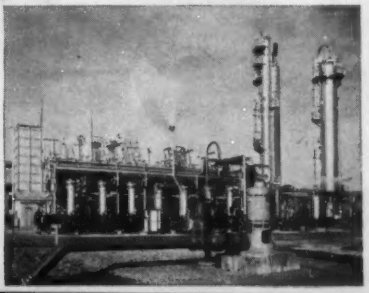
CONTROL for G-E compressor motors is provided by 4160-kv, metal-clad switchgear. Other electrical equipment also receives power through this line-up.



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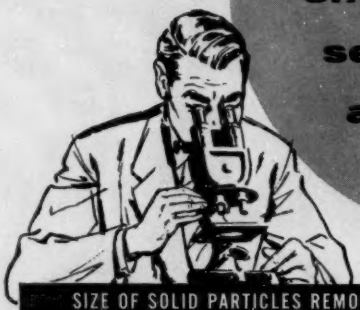


WATER-WELL PUMP is driven by 60 horsepower, G-E Tri-Clad† vertical motor. In the background is Grace Chemical Company's gas mixing equipment.

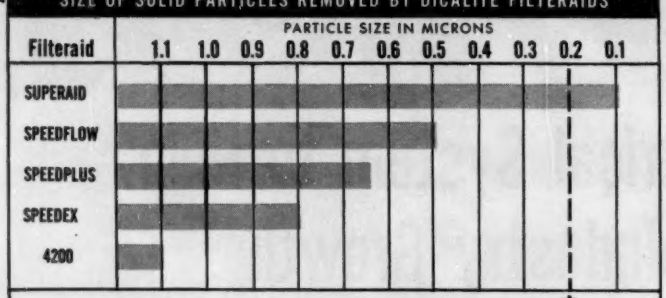


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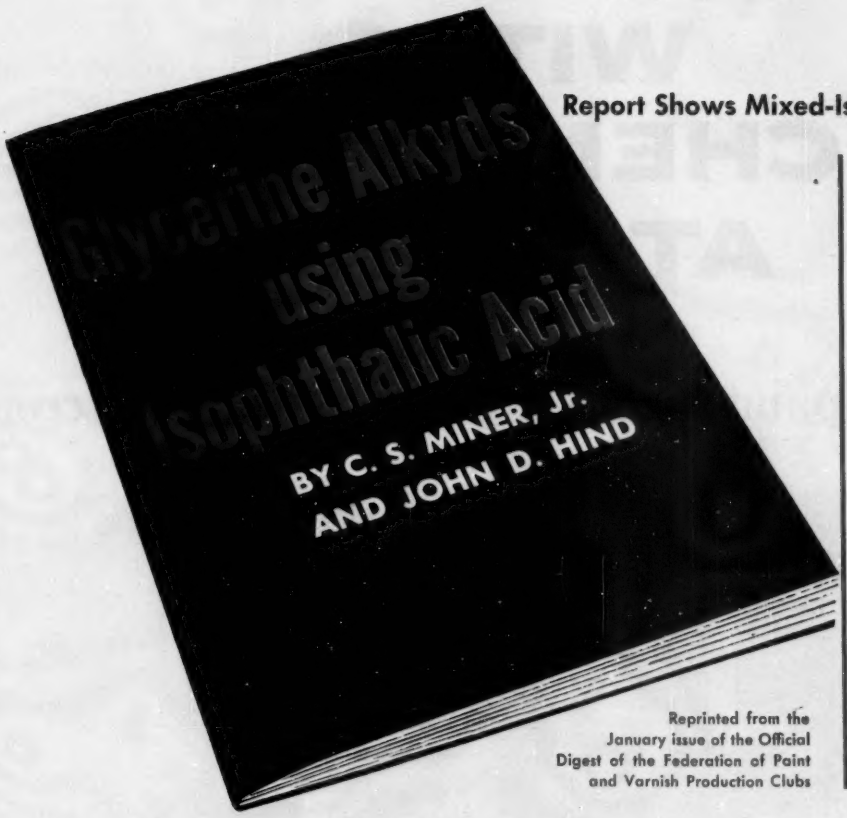
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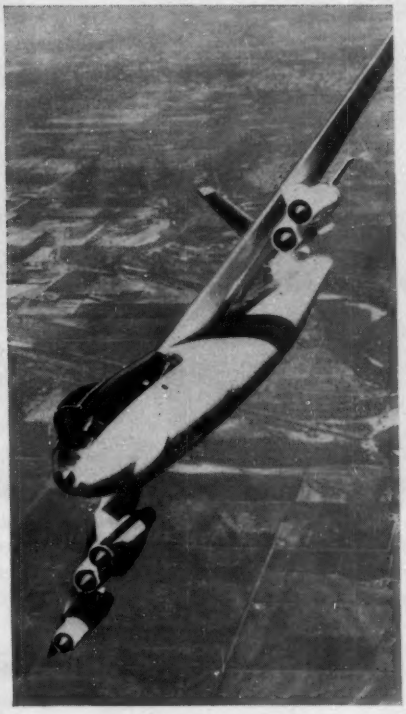
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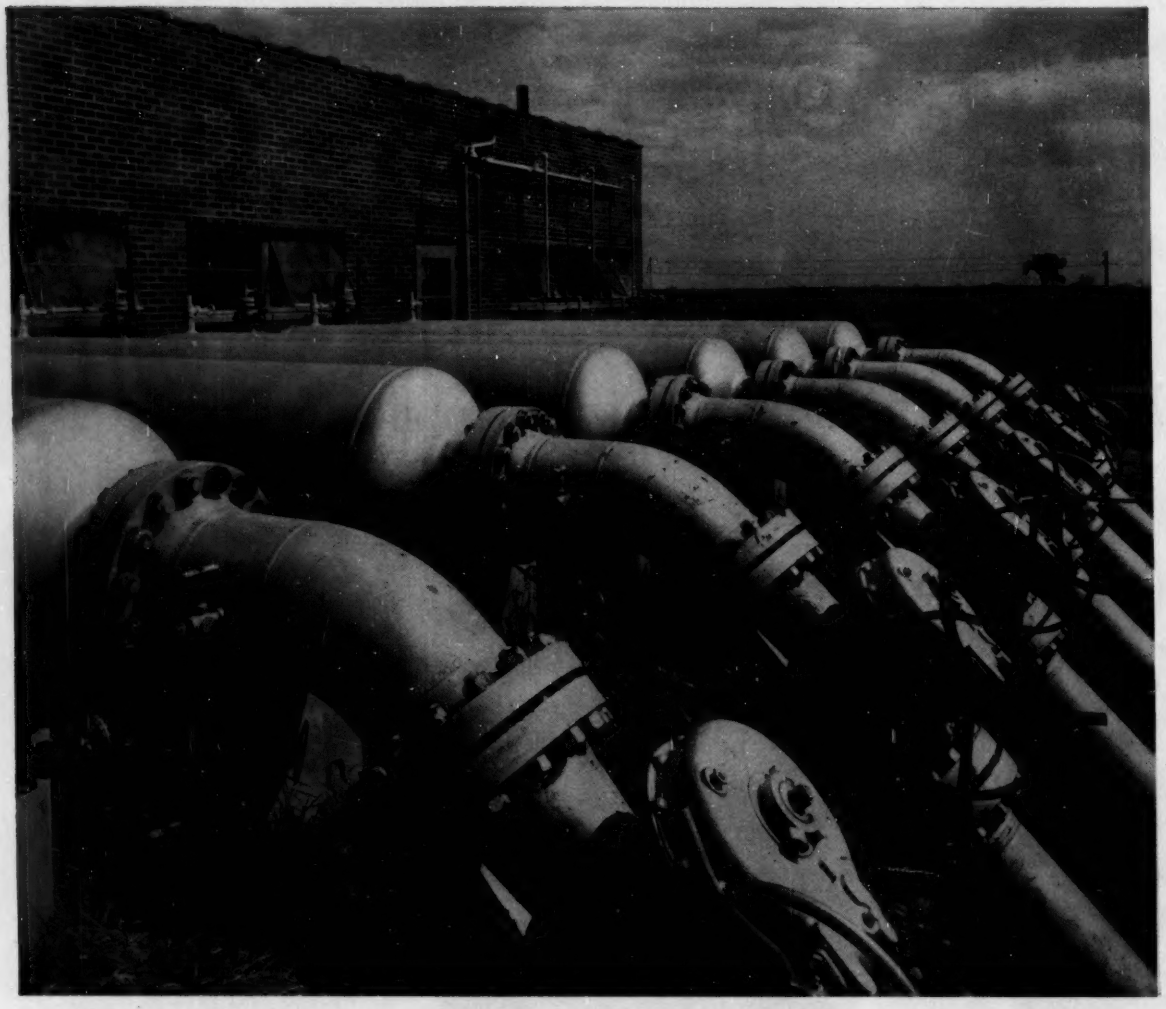
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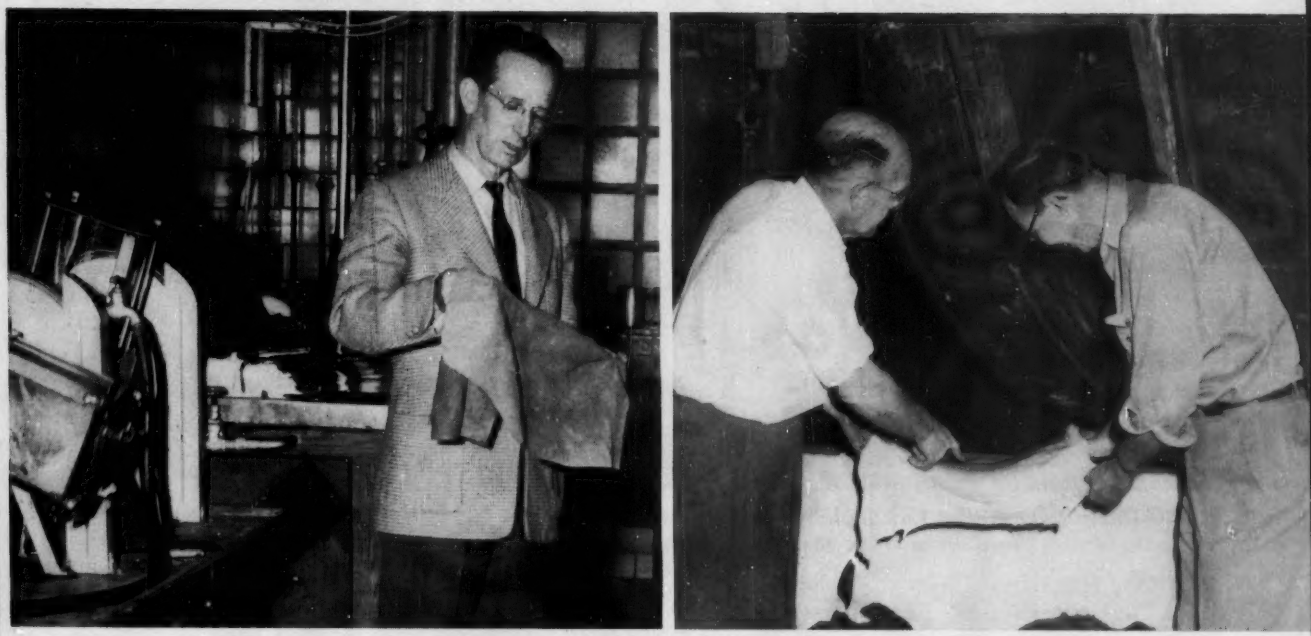
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GAF'S KIRK (left) and WLRC'S SNYDER (extreme right): Different routes are leading both to the same goal.

They're Making a Leather You Can Wash

For the past 10 years, leather makers have been fondly dreaming of a leather glove that could be cleaned in the family washing machine without losing its color, shape or softness. This week, as washable leather gloves and garments are starting to appear in retail stores, there is evidence that they have not dreamed in vain.

Made possible by newly developed dyeing and tanning techniques, washable leather should mean a shot in the arm for the sagging—but still strong—leather glove market of $50 million/year.* And that, in turn, should have a sharp effect on the chemical industry, which sells probably $1.5 million worth of its wares to leather glove makers.

Two on One: Two groups have been independently making big strides in the development of washable leather: the Washable Leather Research Corp. (Gloversville, N.Y.), an organization sponsored by the tanners, and General Aniline & Film Corp. (New York).

Just this week, WLRC revealed that it has made for the first time, commercially, a washable white leather. Now, it says, it has washable products in the complete color range. GAF has been making comparable progress, although it is taking a different approach.

GAF, moreover, has reportedly uncovered techniques of making a leather that can be dry-cleaned. And the tanners' group as well as the chemical company are busily researching methods of making a leather that can be both washed and dry-cleaned. This project, incidentally, is attracting a lot of attention from the garment industry.

Locked In: WLRC's head researcher, Gerald Snyder, has worked intensively on washable leathers since his organization's inception three years ago. In this connection, he has evaluated dyes (including the usual direct types sulfurs, naphthols), as well as many dyeing variations. Finally, he settled on a process utilizing sulfur dyes; his method, according to a patent he has applied for, is suited to grain leathers (e.g., kidskin, capeskin) and suede leathers.

Snyder's process is claimed to permanently lock the dyes and fat liquors (they impart softness to the leather) into the fiber. In the case of conventionally tanned glove leathers, the dyes and fat liquors are deposited on the surface, wash off in a soap solution.

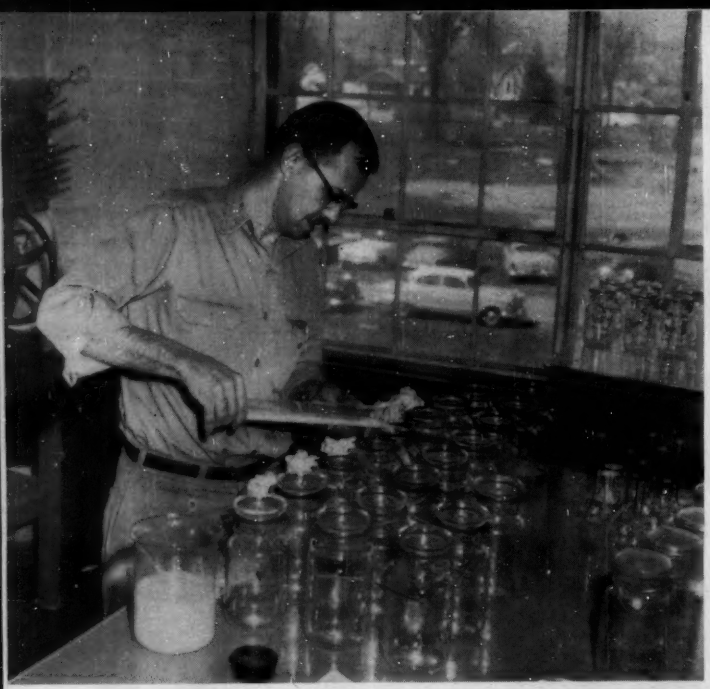
Once the process is set up, Snyder says, it gives easily reproducible results. But he admits that setting it up is tricky, calls for precise ratios and strict control. Here's why:

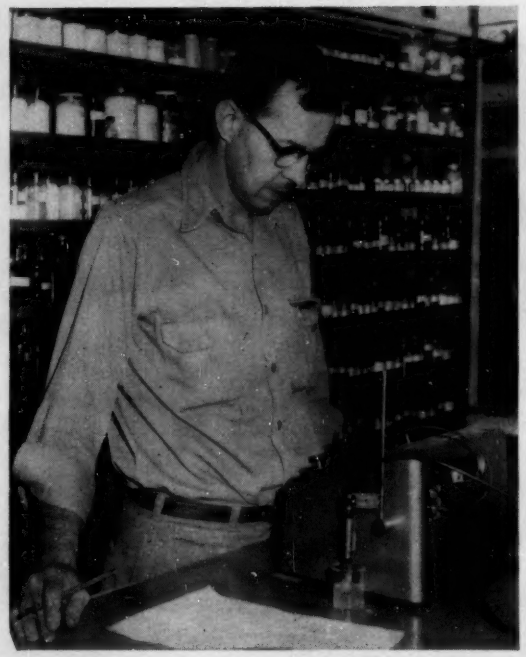
In conventional tanning, pH is kept below 7. That's because the chrome complex becomes soluble at higher pH's and washes out. And the chrome complex is the key to the entire tanning operation; it's what gives leather its characteristic properties.

But sulfur dyes can be applied only at a higher pH. Finding how to keep the chrome complex insoluble at a pH above 7 is Snyder's secret. He reports that the leather of his process is as strong as that made by conventional tanning methods.

And that is noteworthy, since the relatively high pH is a more severe condition for the leather. It can't be

*At the manufacturers' level. Source: National Assn. of Leather Glove Manufacturers (Gloversville, N.Y.).





MAKING THE FORMULA: Snyder sets up formulations in the lab (left), carefully measures all-important pH (right).

Setting up the process is tricky, calls for precise ratios, strict pH control



TESTING: Treated leather sample is checked for color bleed.

left in the dye bath too long or it will lose its strength. Yet, the job can't be rushed or the coloring will be uneven. (In the conventional approach, an uneven dye can be washed out and the material redyed. But this, of course, is out of the question with Snyder's insoluble sulfur dyes.)

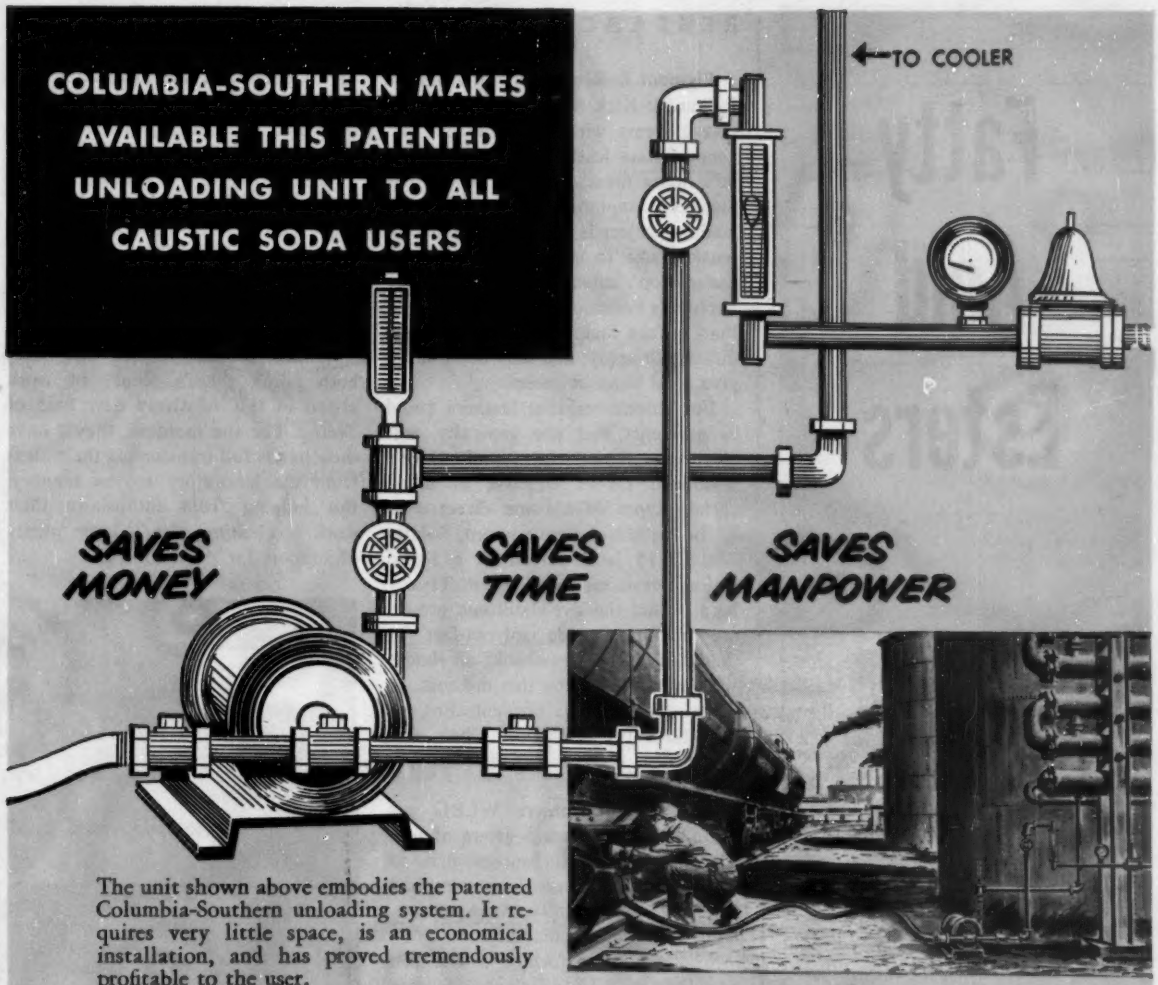
Leather Link: Much of the chemistry of the reaction is still not understood. Snyder, however, theorizes that the dye links to the amino and carboxy groups on the fiber, and actually becomes part of the leather.

The fat liquors are likewise said to be locked into place, providing permanent lubrication of the leather. Although Snyder won't disclose the secret of this phase of the process either, one guess is that Du Pont's Quilon figures in this setup. Quilon, described as a stearato chromic chloride, is theorized to unite chemically with collagen (the protein in leather), forming a permanent, insoluble bond.

Whatever Snyder's method, it apparently works. He says some leathers have gone through 50 washings with no loss of softness.

One disadvantage of sulfur dyes is that they don't allow brilliant shades, especially reds. Snyder is now researching this problem.

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This unloading method was designed by Columbia-Southern's technical staff and engineers in answer to the dire need of consumers for a simple, efficient system that would dilute 73% caustic soda to a 50% concentration before storage with quality maintained.

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Pigment Buildup: General Aniline's J. Stanley Kirk has experimented for several years with washable and solvent-resistant leather dyes. Right now, he's doing most of his work on pigment-type naphthol dyes for washable leather. Object is to build up pigment particle size to a point where soapy water won't affect it. Kirk likes the naphthols because they have brilliance that sulfurs lack. But they, too, are difficult to apply; and they don't easily give good blues or greens.

For solvent-resistant leathers (used in garments that are generally dry-cleaned), Kirk has found GAF's Solidogen LT-13 effective in fixing certain types of chrome direct dyes in the leather. A sequesterant, Solidogen LT-13 is described as a liquid cationic resinous fixing agent. Theory here is that the dye's sulfonic groups are tied up, made solvent-fast by the fixing agent. Drawback: all shades can't be produced by this method.

Although Kirk is concentrating on the above two techniques, he's also doing some work with leuco vats and sulfur dyes.

Ask the Consumer: WLRC got started in 1953 when a group of tanners hired a market survey firm to find out why leather glove sales had fallen off so drastically. Answer: consumers wanted washability.

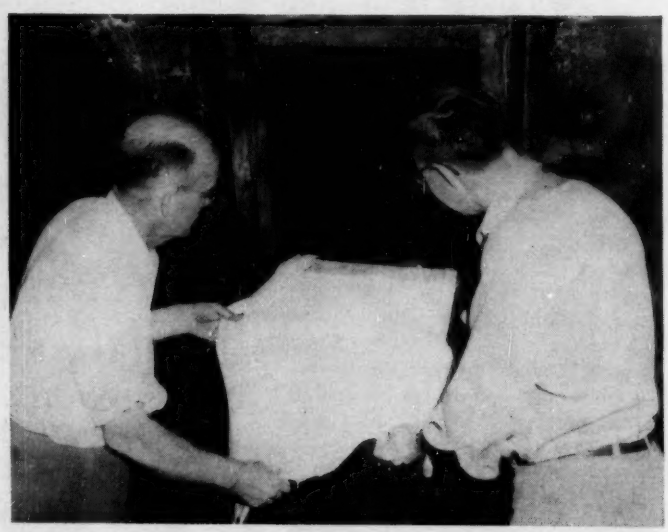
So the tanners formed a research subsidiary — WLRC — hired Snyder (then of the University of Cincinnati) to carry out fundamental research at the university. This work was followed up by pilot-plant and production runs at Gloversville tanneries. Late in 1954, tests indicated that a washable leather could be made commercially. This led to transfer of labs to Gloversville.

Besides research and trouble-shooting, WLRC tests and certifies each batch of washable leather made by its process. Certified washable leathers carry the company's trademark, Launder Leather.

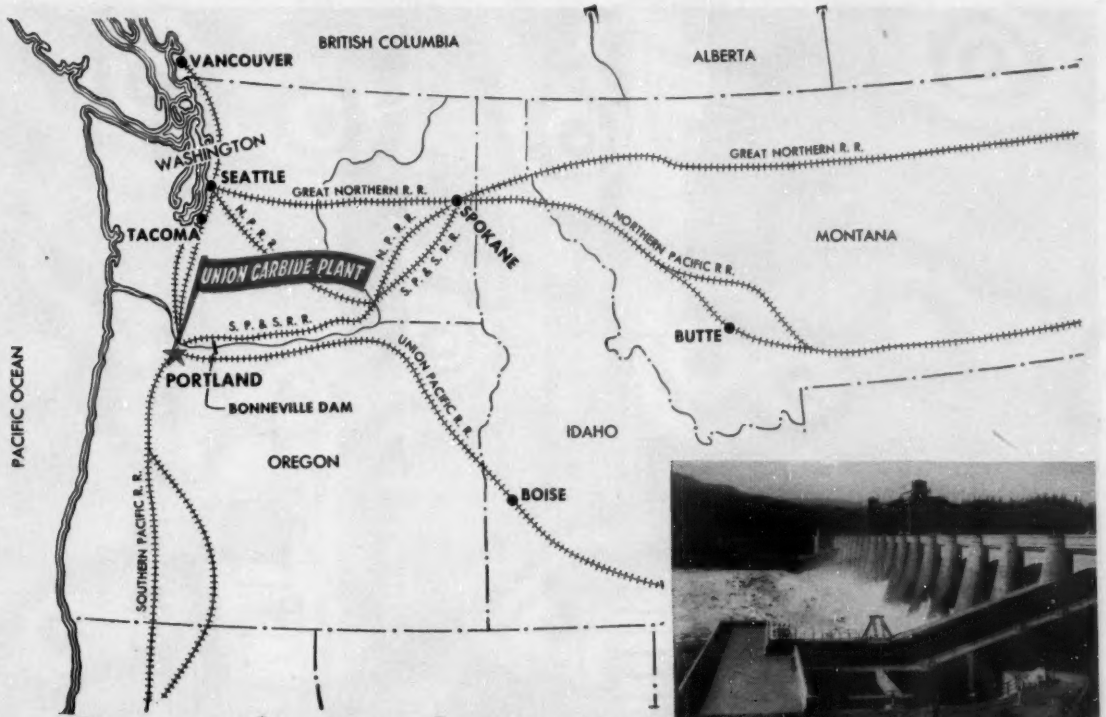
What's Ahead: Snyder and Kirk both admit there's plenty of work ahead in this relatively new field of dyeing. For the moment, they'll have their hands full transferring their ideas from the laboratory to the tannery. But judging from enthusiasm their work is eliciting, they'll have plenty of support for their efforts.



SCALING-UP: Formulations that prove out go to pilot plant.



FINAL TEST: Snyder and tanner examine skin from production unit.



For the Pacific Northwest... Volume Acetylene at Portland

Acetylene—an important raw material for chemical synthesis—can be supplied in large volumes at Portland, Oregon. If you are planning a new chemical plant in the Northwest, and will use acetylene as a raw material, consider the advantages of having acetylene delivered directly by pipe line. No generation equipment is needed at your plant.

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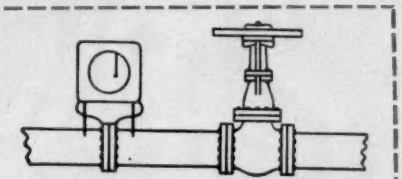
2. Years of Experience. Acetylene has been produced from UNION CARBIDE since 1898, and the many years of experience acquired in generating and handling acetylene are available to you at Portland.

3. Favorable Transportation. Plants located in Portland enjoy strategic transportation advantages. Five major railroads and a number of motor-truck lines serve the area. Portland also has the advantage of a deep-water harbor. Shipment of your products can be made by water between Portland and West Coast cities in the United States and Canada.

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UNION CARBIDE is also produced at Ashtabula, Ohio; Niagara Falls, New York; and Sault Ste. Marie, Michigan. Bulk shipments to chemical users can be made from any of these plants, including Portland. Drum stocks for industrial users are maintained at 111 warehouses throughout the United States.

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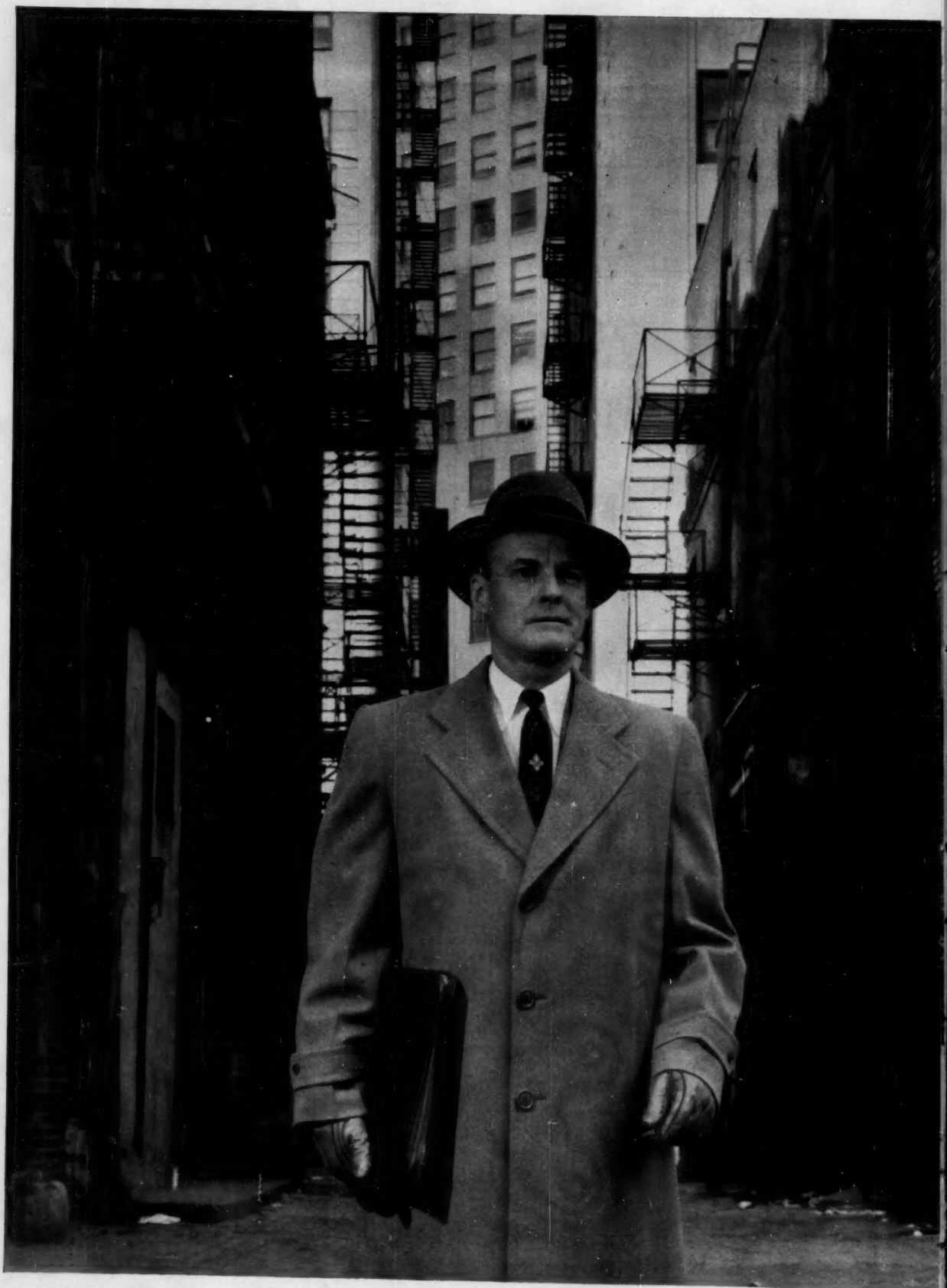


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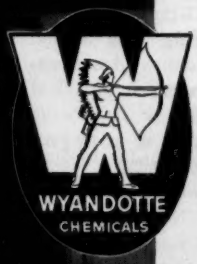
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It is true that there are cases when users of chemicals in less-than-carload lots become so large that chemical distributors cannot properly or profitably service them.

Even then, the manufacturer should not "go in the back door." He should discuss the situation with the distributor. Chances are the distributor will have called this to his attention first.

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LT. COL. COOK: In food irradiation, a boost for power.

Army Poses a Challenge

On an unseasonably crisp day in Washington, D.C., recently, the Army carried this message to assembled representatives of the process industries: food-irradiation research still offers a wealth of challenge to the opportunity-minded investigator.

The occasion was a meeting, under Army and Commerce Dept. auspices, of trade association people and Quartermaster food-irradiation specialists.

Timed to coincide with the Commerce Dept.'s second annual trade exhibit, the meeting also highlighted the commercial implications of irradiation to the chemical industry.

One top need, according to Capt. Reuben Pomerantz, of QM's Food and Container Institute, is for low-cost packaging materials that are suitable for irradiation duties. Pomerantz is confident that the right materials will be forthcoming by the time (within a decade, he estimates) the "conservative food industry" is ready to adopt irradiation preservation in a big way.

This problem must be solved, he cautions, before irradiation can share the field with thermal methods of food preservation.

The Tests: Transparency and toughness are the principal requirements for irradiated-food containers. The right material must be capable of being completely sealed, tough enough to stand up under rough handling, and stable in long storage at room temperature or under refrigeration.

So far, QM has found that conventional tin cans and plastic films fall down on one or more of these requirements. Tin cans rust, develop leaks when stored for long periods in highly humid areas. Irradiated polyethylene film won't take a heat seal, becomes brittle and cracks when refrigerated for long periods.

A laminate of polyethylene and Mylar (Du Pont's polyethylene terephthalate film) shows promise. But the cost of this film now is 5-6 times that of conventional polyethylene. Mylar's cost, however, might be brought down if large-scale production develops.

Still Talking: Meanwhile, talks are under way that may lead to the first installation of food irradiation equipment in a commercial-scale atomic power reactor. A North American-Nebraska group recently approached the Army with a plan to modify its proposed power reactor so as to provide radiation services.

This group, Consumers Public Power of Columbus, Neb., is negotiating with the Atomic Energy Commission toward construction of a sodium-graphite demonstration reactor capable of generating 75,000 kw. of electricity. AEC has already o.k.'d this reactor's tentative design, drawn up by North American Aviation, Inc.'s nuclear design subsidiary, Atomics International, Inc. Completion is scheduled for 1959.

The North American - Nebraska group's interest in approaching QM was explained at the radiation symposium by Lt. Col. Truman Cook, a radiation engineer formerly with Du Pont and Gulf Oil, now serving in the Army's office of the chief of research and development.

Narrowing the Gap: Cook sees in radiation food processing a means of side-stepping the high costs that now retard atomic power development. By using the gamma rays emitted by what are now waste reactor by-products, he maintains, the price gap between nuclear and conventional electricity can be narrowed.

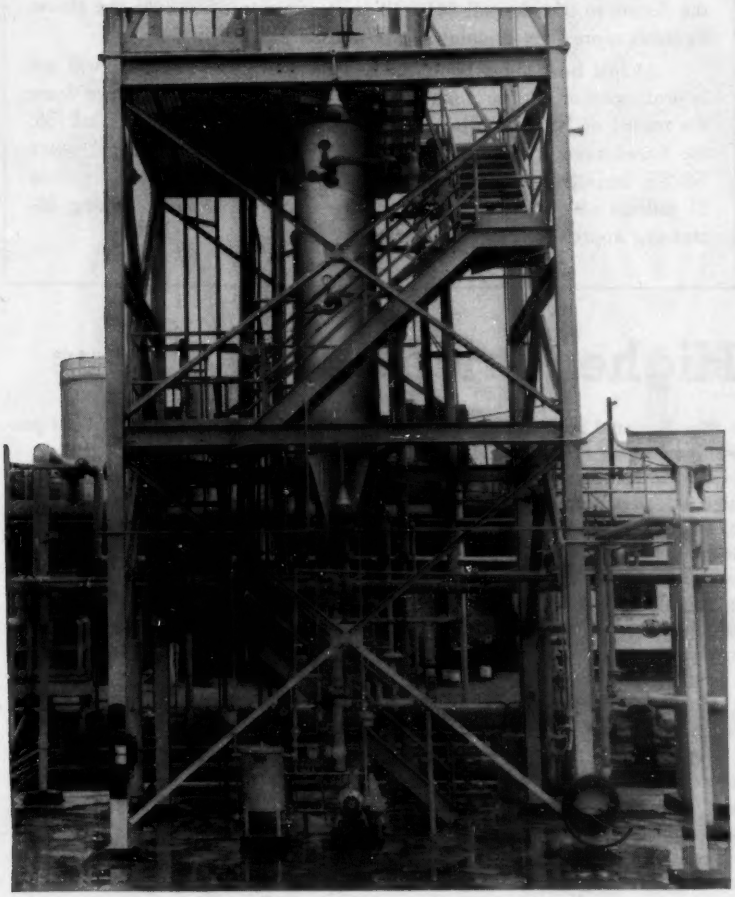
Other groups, Cook avers, are offering power reactors whose over-all economics could be improved if their design incorporated radiation production for food and other materials.

Toward that very goal, the Army is financing a study by a private nuclear reactor builder to determine the probable costs of commercial food-irradiation plants. These cost estimates—separate estimates for various reactor designs—should be ready in about six months and will be disclosed to industry.

But another major source of radiation—modified electron generators, which produce beta rays—may turn out to be the earliest commercial food irradiation tool. Swift & Co. hopes to be selling beta-ray-treated beef steaks within four years.

Cook feels that, while electron generators have advantages over reactors, the latter seem a better bet for large-scale irradiation treatment.

SHELL OIL COMPANY solves scaling problem with Turba-Film Evaporator



Turba-Film Evaporator used by Shell Oil Company, Martinez, California, dries a special type of oil, eliminates scale formation on heat transfer surfaces and provides continuous operation. The Turba-Film Evaporator shown is a No. 5 model built to Shell's specifications with stainless steel rotor, vapor section and outlet cone. It processes 30 barrels of oil per hour.

The problem:

to reduce moisture content of a special type of oil from an initial content of 3 to 6% to a maximum of 0.2%. Standard stills achieved the specified moisture content but deposited inorganic salts as scale on the heat transfer surfaces in such quantities as to demand frequent shutdown for cleaning.

The solution:

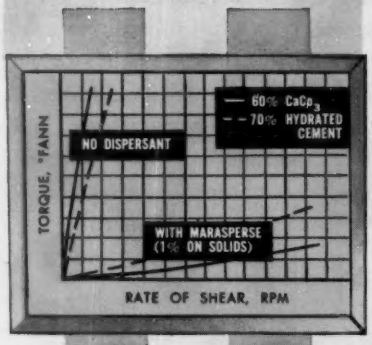
the Turba-Film® Evaporator, now in use for over a year, reduces 30 barrels of oil per hour to the specified moisture content – usually even lower – and precipitates the scale-forming substances in the dried oil, from which they are easily filtered. Shell now enjoys continuous operation in this process without shutdown for cleaning.

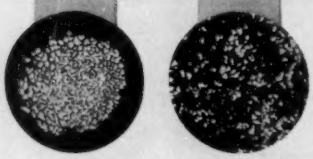
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How Much Will NSF Be Spending?

Prospects are for a big increase in grant programs, because of sharply increased appropriations from Congress. Although no final action has been taken, the House has approved a total of $35 million (for grants and other NSF programs) for fiscal '57. NSF is asking the Senate to o.k. the full $41 million it requested. But even the House figure is more than double the $16-million budget of '56.

Just how big a boost the chemistry support program will get is problematical. But an idea of what may happen can be drawn from the record of NSF spending for basic chemical research. In fiscal '56, the foundation is spending $1,183,500 (82 grants); for fiscal years '52-'55, inclusive, the figure was $1,907,700 (171 grants). More than $1 million of this money, moreover, was spent in '55—reflecting increasing appropriations from Congress.

Higher Price on Polymers

The National Science Foundation is well on its way toward developing the expanded basic research program in high polymers proposed last December by its 11-member special rubber-research commission.

The commission, headed by New York patent attorney and former War Labor Board chief William Davis, made these two recommendations*.

- NFS's present $1,036,000/year program in support of rubber research "should be regarded as terminated at the end of June 1956." Taken over intact from Federal Facilities Corp., when the government sold its synthetic plants last year, that program comprises 11 NSF grants (to university, foundation and government scientists) covering basic and applied studies of synthetic rubber. The money comes from the sale of synthetic rubber plants.
- In its place, NSF should support "a new and more basic program made up of research projects in the general area of molecular structure . . . composition and properties of high polymers, particularly elastomers, and methods of preparing such materials." The commission carefully avoided putting a price tag on this program, but strongly urged "generous and expanding support." And it recommended that special funds be furnished to NSF for fiscal 1957 to be used in winding up the old program, absorbing parts of it into the new program.

*Both of which have been endorsed by NSF's director and President Eisenhower.

Preserving the Spirit: NSF's plans indicate that it will follow the spirit, if not the letter, of these suggestions. Here's what NSF has in mind:

The 11 grants for rubber research will be terminated June 30. Starting July 1, NSF will obligate about $600,000-650,000 in new grants for high-polymer research. All but about $100,000 of the total has already been earmarked for continuing—at a reduced level—most of the 11 projects conducted under the current rubber program. The remaining $100,000, or so, will be apportioned late this month among new applicants seeking NSF support for high-polymer research projects.

Since this money will be spread over projects running from one to three years, the actual level of new grants for the coming fiscal year (starting July 1) comes to about $300,000. This is in addition to about $90,000 that will be available in 1957 from funds obligated to high-polymer research in prior years.

This adds up to about $390,000 for high-polymer research (including parts of the old rubber program) in fiscal 1957—compared with about $1,125,000 being spent during this fiscal year—nearly all of it for synthetic rubber.

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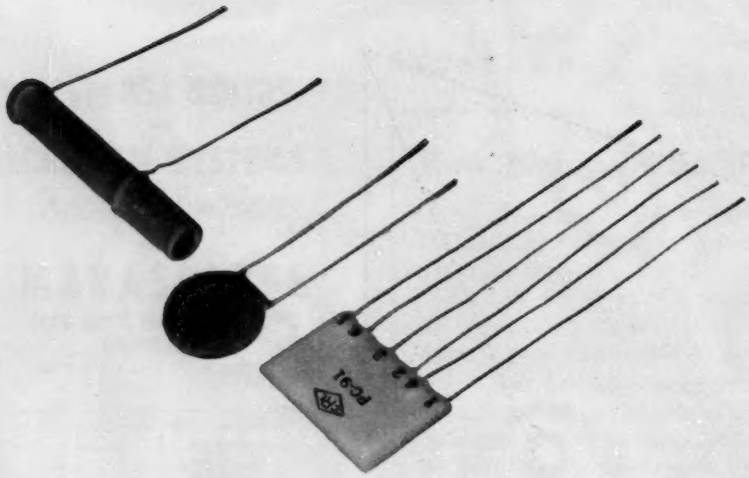


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mission's proposals is in its plans for fiscal 1958 and beyond. NSF has turned down the idea of backing a special high-polymer research program on a long-range basis. Instead, starting July 1, '57, it will incorporate high-polymer research into its broad grants program for basic research in chemistry.

Those familiar with the situation say this is not very far afield from the basic thinking that motivated the commission's proposals, even though it narrows the latter's scope. The commission, in proposing a separate high-polymer research program, said it would cover a "scientific area that lies at the interface of chemistry and physics. It is much broader than any single industry or any one of the specialized scientific disciplines."

Right now, there's a possible hitch to NSF's high-polymer grants. Both NSF and the Budget Bureau had planned to finance the major part of these projects with "carry-over funds" from this year's operations—with the largest share representing receipts from private contractors using the government rubber laboratory at Akron, O. But, objections recently raised by the General Accounting Office have temporarily blocked this plan. It's likely that the Budget Bureau will ask Congress to allow use of the carry-over funds, overrule GAO's objections.

APPARATUS . . . .

Rugged Gland: Arthur F. Smith Co. (Rochester, N.Y.) now offers a laboratory gland of Du Pont Teflon for flasks. The device is said to offer advantages over mercury-sealed or precision-bore stirring arrangements. Called the Asco Gland, it is non-breakable, chemically inert, provides a vacuum-tight seal. Price: $11.75.

•

Calorimeter: National Bureau of Standards researcher R. S. Jessup has designed a Bunsen-type calorimeter that precisely measures very small quantities of heat at room temperatures. It's intended for investigations of the basic thermodynamic properties of high polymers, is said to be particularly suited to measurement of heats of reaction, solution, and mixing.

•

Safety Tongs: Called Niptongs, a miniature mechanical manipulator for

handling small amounts of radioactive material is now offered by The Atomic Center, Inc. (New York).

•

Do It Yourself: For extruding metallic sodium required in analytical work (e.g., residue determinations on chlorinated hydrocarbon insecticides), U.S. Dept. of Agriculture's Harold Rusk (entomology research branch) has designed a press that can be built for about $10.

•

Pipette Rinser: The Nalge Co. (Rochester, N. Y.) offers a new Nalgene Model B Automatic Pipette Rinser of all-polyethylene construction. Features: fast rinsing, efficient recycling. Also available: polyethylene baskets and jars.

EXPANSION . . . .

These firms are making expansion news:

• Thiokol Chemical Corp. (Trenton, N.J.) will build a $2-million rocket and guided missiles research and development center near Corinne in northern Utah.

• Headquarters and applications laboratories of W. R. Grace & Co.'s newly formed polymer chemicals division will be located in Clifton, N.J.

• Eli Lilly and Co. will build a $3-million agricultural research center on 417 acres at Greenfield, Ind., site of its biological laboratories.

• Bird-Archer Co., water treatment engineers, has moved all facilities from New York to its Philadelphia headquarters, occupied a new laboratory that doubles its research facilities.

• American Viscose Corp. plans to double the size of its research and development quarters at Marcus Hook, Pa.

• Evans Research and Development Corp., New York chemical consultants, plans increases in research personnel, laboratory space, and equipment.

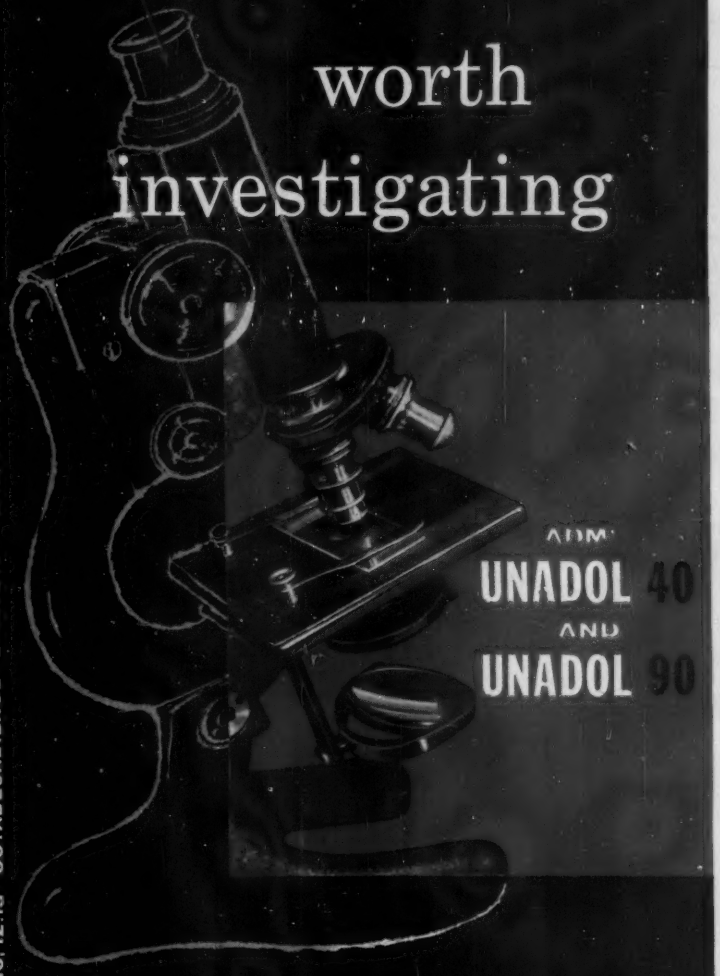
• Columbian Carbon Co.'s new $350,000 office and laboratory center in Monroe, La., should be ready about Oct. 1.

• Carlisle Chemical Works (Reading, Pa.) has completed new research facilities, replete with an underground bomb shelter.

• Courtaulds (Alabama) Inc. plans to build a $1-million textile research and development laboratory and pilot

worth investigating

9:10, 12:13—OCTADECADIENOL—LINOLEYL 9:10, 12:13, 15:16—OCTADECATRIENOL—LINOLENYL



Hydrogenated and Distilled Fatty Acids and Stearic Acid . . . Hydrogenated Vegetable, Fish, Sperm Oil and Tallow . . . Hydrogenated Castor Oil . . . Stearyl, Cetyl, Oleyl Alcohol . . . Sperm Oils and Spermaceti . . . Behenic Acid . . . Erucic Acid . . . Hydroxystearic Acid.

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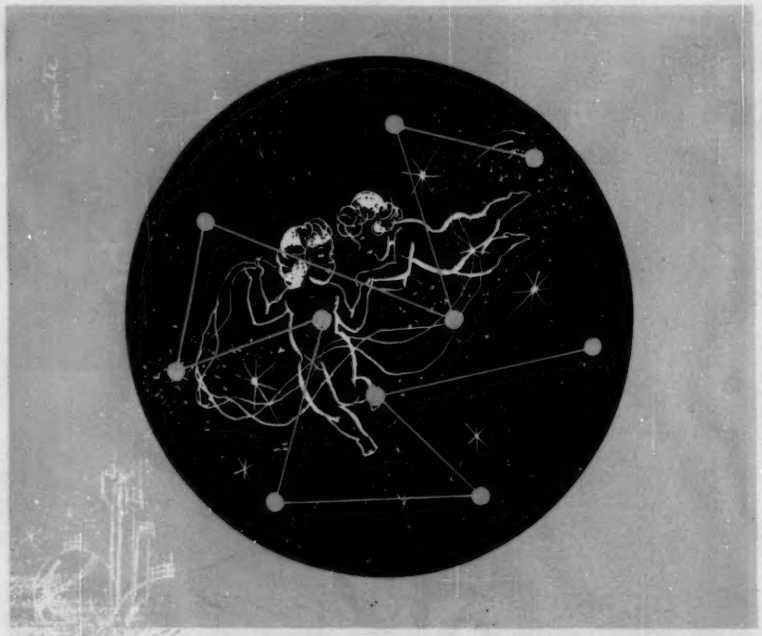
UNADOL 40 and UNADOL 90—two more new fatty alcohols—are now available from Archer-Daniels-Midland.

The new unsaturated alcohols are liquids—almost water-white. The principal component of UNADOL 40 is *linoleyl* which possesses two double bonds. The principal component of UNADOL 90 is *linolenyl* which contains three double bonds.

The double bonds and the one Hydroxyl group offer limitless possibilities for chemical reactions. Successful product advantages are very likely in manufacturing new protective coatings, resins, surface active agents and chemicals.

Now available for immediate shipment in tank-car or LCL quantities from Ashtabula, Ohio. For samples—and for our new bulletin with chemical reactions of 30 new fatty alcohols, write on your letterhead.

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Publishing Date — September 15th
Closing for Advertisers — August 15th

1956 Chemical Week Buyers' Guide

A McGraw-Hill Publication, 330 West 42nd Street, New York 36, N. Y.

RESEARCH . . . . . .

plant at its Le Moyne, Ala., plant site.

• Universal Oil Products Co. will build an automotive laboratory as part of a $750,000 expansion at its Des Plaines, Ill., headquarters.

• Morton Salt Co.'s new multi-million dollar research building is now in operation at Woodstock, Ill.

• Sun Oil Co. has broken ground for a new $600,000 laboratory in Toledo, O., expects to complete the structure by Nov. 1.

• Ethyl Corp.'s new $500,000 addition to its Baton Rouge, La., chemical research laboratories has gone into operation.

PRODUCTS. . . . .

Therapy Aspirants: Consultant Henry Norsen (Dobbs Ferry, N. Y.) is now making 2-amino-5-methyl-1,3,4-thiadiazole and derivatives (e. g., 2-sulfanilamido, 5-methyl-1,3,4-thiadiazole). Potential value: in cancer chemotherapy research (*CW, Feb. 4, p. 66*).

•

CO_2 Absorbent: A new carbon dioxide absorbent for respiratory protective devices has been developed by the Indian Fuel Research Institute (Jealgora). Called Lisasorb, it's manufactured by fixing soda lime on a kieselguhr-alumina base. Quality is reportedly comparable to absorbents now imported by India.

•

Radiochemical: Labeled histamine (2-*ring*-C-14) dihydrochloride has been added to Nuclear Instrument and Chemical Corp.'s (Chicago) list of radioactive carbon compounds. Available at an activity of one millicurie/millimole, it's a tool for studying amino acid formation and metabolism, allergic reactions and general body physiology.

•

Fatty Acid: A new hydrogenated fatty acid for use in lubricating greases is available from Swift & Co. (Hammond, Ind.). Identified as Swift's Hydrogenated Fatty Acid No. 62, it's of vegetable origin, features a high melting point and high stearic acid content.

•

Substrate: A new synthetic substrate, 6-bromo-2-naphthyl-β-D-glucuronide, is offered by Dajac Laboratories. It's useful for studying β-glucuronidase in tissue—histochemically

or colorimetrically. A synthetic, the product is said to feature rigidly controllable purity.

LITERATURE. . . .

Literature in the news this week:

• Fisher Scientific Co. (Pittsburgh, Pa.) is out with a new 370-page index listing over 7,300 chemicals. Designated Catalog 120-C, it can also be used as a reference for structural formulas, melting and boiling points, formula weights, color-index numbers.

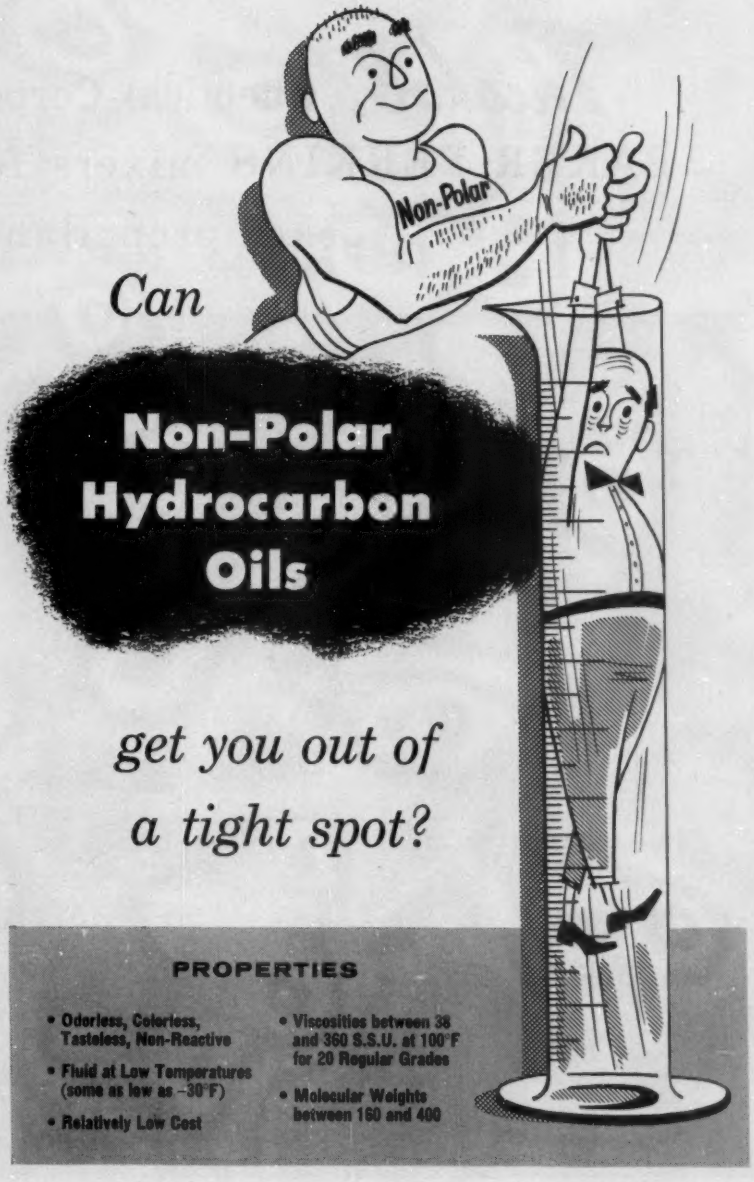
• A new catalog of apparatus and accessories for chromatography and electrophoresis is available from Scientific Glass Apparatus Co. (Bloomfield, N.J.). Included: a section on special glassware, e.g., chromatographic tubes, columns.

• Just issued by the Atomic Energy Commission is an 817-page book, "Radioisotopes in Medicine," which contains the complete proceedings of a special course on the subject conducted in 1953 by the Oak Ridge Institute of Nuclear Studies. Problems in radiation, tumor localization, diagnostic and therapeutic uses of radioiodine are covered. It's available from the U.S. Government Printing Office, Washington 25, D.C. Price: $5.50.

• Supplement No. 4 of the "Annotated Bibliography on the Use of Organolithium Compounds in Organic Synthesis" is available from Lithium Corp. of America (Minneapolis). Containing 271 papers published during 1954 and 1955, it lists abstracts, also provides an index of compounds mentioned in the abstracts.

• The American Society for Testing Materials (Philadelphia) is out with a bibliography on redisposition of soil on cotton fabric. It covers the period 1909-53, contains 171 entries. Detergent workers, especially those just entering the field, should find it beneficial.

• For photochemists and other smog researchers, the Air Pollution Foundation (Los Angeles) has just published a 140-page report, "Solar Radiation, Absorption Rates, and Photochemical Primary Processes in Urban Air." Authors Phillip Leighton and William Perkins based much of their work on varying intensities of sunlight during the day and year, report the amount of solar energy available and the chemical reactions among various pollutants in the Los Angeles area.



Can any of the above properties help you solve a problem in the quality or processing of your products? Non-polar hydrocarbon oils (white oils) have long been used by makers of drug and cosmetic preparations. Today the application of these versatile oils goes far beyond, into fields where their purity, stability and low cost are employed to considerable advantage in a wide variety of products.

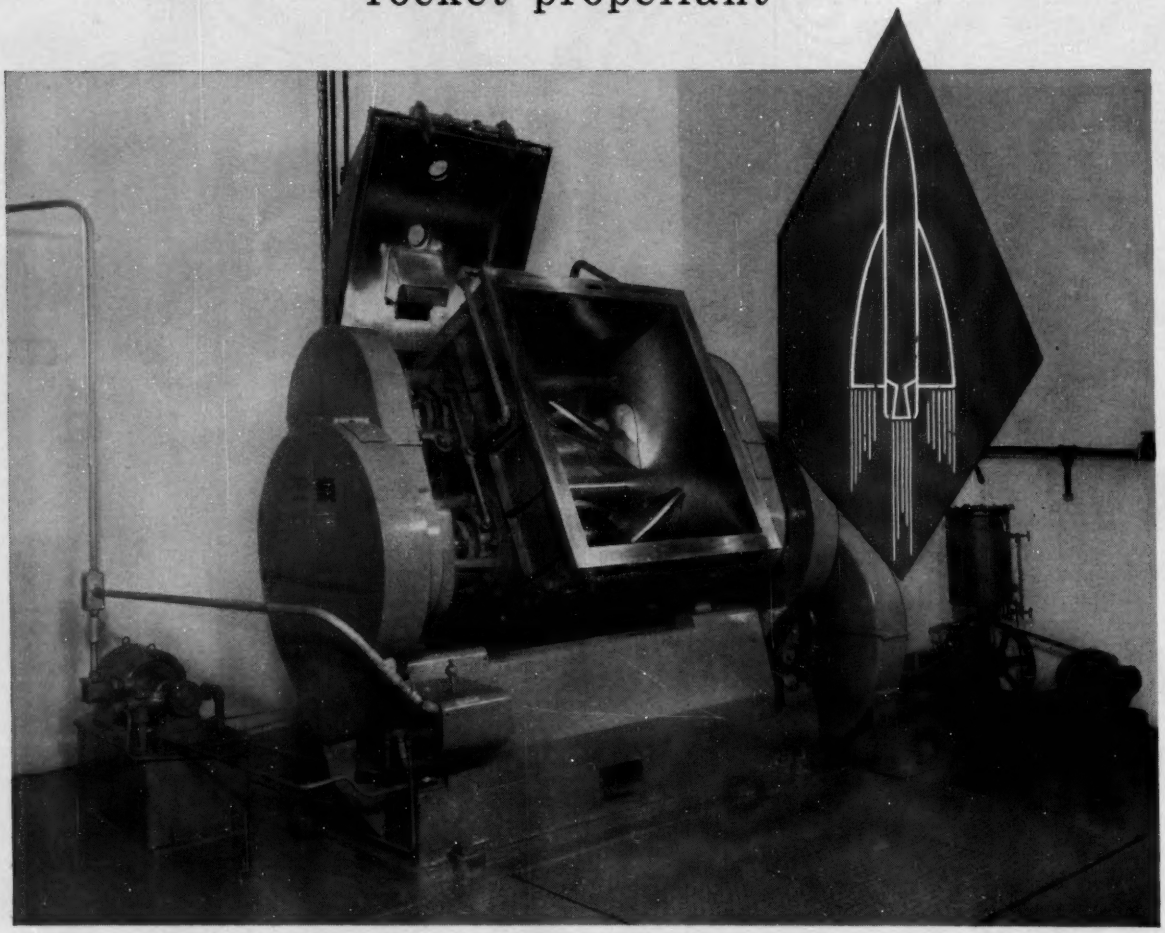
CURRENT APPLICATIONS: reaction media; extractants; aliphatic raw material; plasticizers; softeners; anti-caking, anti-dusting and detackifying agents; water repellents; special lubricants; textile specialties.

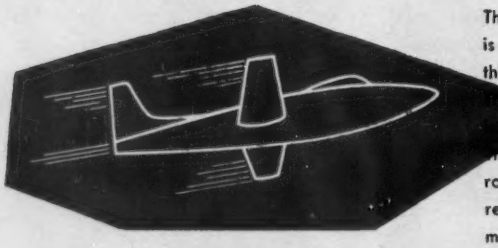
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Thiokol® Chemical Corporation selects BAKER PERKINS mixers for processing rocket propellant





The mixing of rocket propellant from new high-energy fuel materials is a sensitive, highly demanding operation. The mixers which do this blending must therefore be not only efficient, but dependable. [illegible] Perkins No. 15 Mixer shown here is but one of many [illegible]ration in the rocket propellant field. This unit at the [illegible]hiokol Chemical Corporation is enclosed in an explosion-proof room of reinforced concrete, and is engineered for complete remote control operation. Powered by a 50 H.P. silent chain drive motor, the No. 15 Mixer is constructed of Stainless Steel, and jacketed to carry 125 psi pressure of steam or water. Its Sigma blades revolve on anti-friction bearings, hydraulic tilt is provided for the mixing chamber, and the vacuum cover is pedestal mounted. Working capacity of this mixer is 100 gallons, and total capacity 150 gallons. If you have a process that calls for a high-performance mixer, write Baker Perkins for complete catalog.

Baker Perkins Inc.

Chemical Machinery Division
Saginaw, Michigan

Technology

Newsletter

CHEMICAL WEEK
May 19, 1956

Don't be surprised if you soon hear that Du Pont and Carbide have completed negotiations with Italy's Montecatini to gain access to the polypropylene investigations of J. Natta of the Milan Institute.

A number of firms (32 at last count) have been talking to Montecatini on that very subject. Du Pont, Carbide and one or two others are believed to have at least made oral agreements.

Ironically, both firms are undoubtedly far ahead of Natta in developing crystalline polymers of polypropylene. Another firm that has probably gone beyond Natta is R. S. Aries and Associates (New York City). Aires' process has been tried here and in Europe, and he is interested in licensing it for polyethylene and higher olefins. Not much is known about the method, except that its catalyst is an article of commerce. Aries has told prospective clients that processing requirements are simple and that the catalyst can be washed out without any trouble.

The patent situation regarding polyethylene and higher polyolefins made by processes that are primarily catalytic (rather than high-pressure) has never been very clear. And it's getting less so all the time. Firms on the continent presumably have had access to Natta's work through their arrangements with Ziegler. But only three of the American Ziegler licensees are believed to have arrangements covering "polyolefins."

Don't count Shell Chemical out of the polyolefin picture, either. English Shell Chemical just last week revealed that it was going to build a 1,000-tons/year Ziegler plant in Surrey. Through its purchase of Petrochemicals Ltd., Shell has exclusive rights to Ziegler's work in England. It has been pilot-planting polypropylene (*CW Technology Newsletter, Feb. 4*). And it was displaying samples of low-pressure polyethylene at the recent British Industries Fair.

Some new propellents will get a big play in aerosol packaging if Connecticut Chemical Research has its way. The firm has developed a series of propellents (tagged Polysols) using—alone or in combination—such gases as argon, propane, butane, helium, carbon dioxide, nitrous oxide.

They're not intended to replace the familiar fluorinated hydrocarbons. Rather, they're supposed to permit the packaging of depilatories (based on thioglycolic acid), mouthwashes, antiperspirants, even foodstuffs. In all of these cases, toxicity is an important factor. The firm is also playing up the fact that the gases are medically safe. But you have to remember that Freons, for example, haven't passed the two-year animal feeding tests, simply because they haven't completed their test period yet.

In any case, Connecticut Chemical is doing strictly contract packaging right now. It will, however, consider licensing the process.

Technology Newsletter

(Continued)

A battle that may have a telling effect on the future of mental drug development and manufacture broke into the open last week with charges in Congress that government scientists are holding back development of the drugs.

Making the charge: Mike Gorman, executive director of the privately sponsored National Mental Health Committee. A crusader in the mental health field (author of "Every Other Bed," World Publishing), Gorman sees the new tranquilizers as a major breakthrough in treating the mentally ill. But he feels that the National Institute of Mental Health (of the U. S. Public Health Service) is shirking its duty by failing to take full responsibility for evaluating the drugs.

•

Another step toward the goal of completely tinless tin cans was taken last week by American Can. It revealed it has a "margin plating" process, a method of soldering the seam that eliminates "almost all" the tin used in cans. (The only tin needed is in the soldered sideseams, which are no more than $\frac{3}{16}$ in. thick; the rest of the can is made of enameled steel.)

Eventually, says Canco, margin plating may save up to 2,600 tons of tin annually. (Total U. S. consumption of tin hovers around 80,000 tons/year.)

Canners aren't the only ones working on a can that doesn't use any tin at all. Firms like Dewey and Almy, General Mills, Goodrich Chemical and Monsanto are interested in them as a potential $20-million/year market for adhesives (*CW, Oct., 29, '55, p. 34*).

•

The chemical industry's prospects in the lubricant field were suggested in two separate statements last week:

• According to General Electric researcher Donald Wilcock, GE is "on the doorstep" of finding a lubricant for the aircraft industry that operates at temperatures in the 1000-2000-F range. The trouble with promising compounds thus far investigated is that they freeze at temperatures around 400 F. So chemists are trying to modify their structures, build more "oiliness" into the molecules.

Best bets, he indicated, are the silanes, which freeze at close to 200 F, boil at around 850 F. Wilcock made his statements to the Northern California Section of the American Society of Lubrication Engineers in San Francisco.

• On the other hand, chemical additives for automotive oil (detergents, etc.) may be headed for unemployment. The gas turbine will require straight crude. This flat statement was made to *CW* at the Oil Men's Dinner in Detroit by a leading automotive researcher.

•

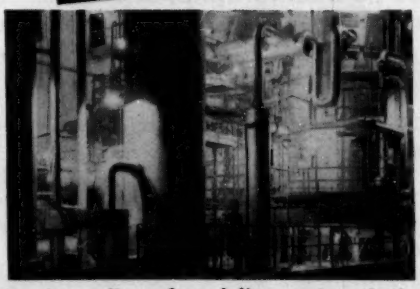
The chemical industry is getting safer all the time, says the Manufacturing Chemists' Assn. Figures just compiled by MCA show that in 1955 the accident frequency of its members dipped to 3.25 (accidents/million man-hours worked), a slight improvement over 1954's 3.27.

Spencer Service is Wonderful



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2. **RCI surface coating resins**—include alkyd resins for superior automotive finishes and polyvinyl acetate emulsions for durable exterior masonry paints.

3. **RCI polyester resins** — combine with diisocyanate to produce polyurethane foams (currently being considered for auto seat cushions); permit fast production and uniform results in such reinforced plastics products as sturdy boat hulls and water skis.

4. **RCI pure and modified phenolic resins** — make auto waxes and polishes harder and longer-lived.

5. **RCI pentachlorophenol** — is an important ingredient in easily-applied preservatives for wood. It helps make wood exposed to weather last for many years.

6. **RCI urea-formaldehyde resins**— add wet strength to paper "windshield towels."

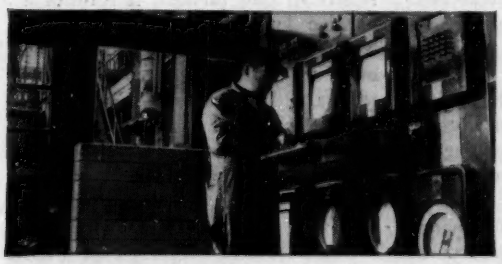
7. **RCI ester gums** — constitute the base for many of today's bubble gums; are also used in leather adhesives.

The next time you have a supply problem (or a technical problem), take a look at RCI. See where fast delivery of these quality-controlled RCI materials (or any of those listed with our signature) can help you.

.. RCI is in the Picture!



MALEIC ANHYDRIDE—Reichhold produces and sells this important basic chemical; and uses it in making POLYLITE polyester resins. Here RCI operator checks main controls in maleic plant.



PLASTIC BEAUTY—RCI POLYLITE polyester resin is used to build the reinforced plastic hull of a high-speed outboard fourteen feet long. This ultra modern craft weighs only 350 pounds.



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Comet on the Cleanser Shelf

Glowing in gold and green and red, a new comet—Comet cleanser—flashed into view last fortnight, signaling the entry of Procter & Gamble into the household scouring powder field. Though still in introductory market areas*, the new product could cause a real shakeup in the scouring powder business, for it introduces a combination of ideas:

• It's made with a sort of "chlorinated TSP," the type of ingredient currently incorporated into such automatic dishwashing detergents as Electrasol and Thanx. This, apparently, is the Chlorinol additive emphasized on the label (it's listed as TSP and sodium hypochlorite), which also names dodecyl benzene sulfonate as an ingredient. "Magic bleaching action," germ-killing ability are claimed, too.

• It's tinted a light, ultramarine green. None of the big sellers currently on the market are colored, although some have dyes that show up when they're moistened.

• Package is somewhat more expensive than conventional types. An American Can product, it features a glassine interliner for the fiber-tube body, and a lacquer coating on the metal end plates. It's also a little slimmer, a little taller than conventional cleanser packs (two sizes, 14-oz. and 21.5 oz., are offered). One result is that Comet is also slightly higher priced than most of the nationally advertised cleansers.

These features, properly capitalized upon by promotionwise Procter & Gamble, could help put Comet into serious competition for a market estimated to be worth $66 million yearly. But until it is national—and P&G

*Test cities are Columbus, O.; Madison, Wis.; Peoria, Ill. The product is P&G's only cleanser, now; it did sell one called Chic for a time, for industrial use.

won't say when this will be—the established sales leaders like Colgate's Ajax, B. T. Babbitt's Bab-O, Purex' Old Dutch, and Bon Ami will have the necessary time to evaluate these formulation and packaging novelties before their over-all sales are materially affected.

Plenty of Activity: Even without the P&G product to live in the fracas, the cleanser battle has been particularly sharp in the past few months—it's been more active than it has been in almost any of the years since cleansers have been major household products:

- Currently, there's a lot of emphasis on bleaching action—along with talk of germ killing, deodorizing. This was kicked off by Old Dutch in the summer of '53 (*CW, Aug. 1, '53, p. 34*), and has been heavily emphasized ever since. Both hypochlorite and perborate bleaches are used. (Colgate, for example, has experimented with both, currently features a perborate in its nationally sold product.) And now, with the exception of Bon Ami, all the top-selling cleansers use synthetic detergents for greater sudsing action, faster grease-cutting.
- New package size. With a few exceptions, the cleansers are now offered in 21-22-oz. sizes, as well as in the long-standard 14-oz. size. Both Ajax and Bab-O have claimed a first on this; at any rate, it seems to be part of the trend toward "economy" size packages, although there seems to be no clear-cut evidence that it has expanded total cleanser sales.
- New shaker tops—Bon Ami plainly has a first here. Its perforated, tape-sealed package was introduced in mid '55, and will be followed soon by others. Both Bab-O and Ajax have been sold in some cities with the new type of top; Ajax will be national with it before long. Convenience, safety are the appeals of the new lid—it doesn't need a sharp tool to be opened, and powder flow is evener and more readily controlled.

(The Bon Ami innovation somewhat surprised the trade—the firm has had a most conservative reputation, and has been staunchly resistant to change. But currently, Bon Ami is showing signs of branching out—its first new product in years, an aerosol, is now in test-market cities. New ownership, United Chemical & Dye, could mean more changes ahead.*)

Popularity High: Across the nation, the percentage of families using the cleansers runs high. Consolidated Consumer Analysis, made by some 20 papers in cities in all parts of the U.S., indicates that 95% or better of U.S. homes do make use of scouring powders. And in all these, Ajax holds the top spot. (It's generally conceded to take at least 55% of the national consumer market, despite increasing competition, locally and nationally.)

Chicago is one area where the percentage of families consuming cleansers is markedly low. A survey by the *Chicago Tribune* indicates that only 59% of the families there buy the cleansers (survey is based on a cross-section of about 800 families; some 576 reported on scouring powders). As in most other areas, Ajax pulls best. Bab-O takes second. Two local brands, Kitchen Kleanser and Swifts, take the next spots, with Old Dutch following. Cameo, a local product whose maker was recently acquired by Babbitt, and Bon Ami come next.

Slim Profit: The brand status in Chicago is illustrative of the case in most areas. The national products get the cream of the market; the locals take what they can of the percentage that's left.

Local products often sell at a slightly lower price than the broadly distributed products. For one thing, shipment of the highly inert cleanser is an expensive job—locals save in this case as well as on advertising. As a result, they can—and generally do—sell at perhaps a cent or two less per can. Sometimes, as does Cameo, they emphasize a premium—Cameo offers a plastic shaker at reduced price.

Colgate is a firm with both local and national interests. Its Ajax meets competition in the East from two other Colgate items—Kirkman cleanser and Octagon cleanser. Both feature bleaches and high-sudsing synthetic detergents like Ajax, and both are priced below Ajax.

Generally, the "locals" don't introduce novel ideas in formulation or packaging. But they do take up the trends set by the national brands, and give the economy-minded housekeeper a way to make slight savings. Not surprisingly, in prosperous times like these, price seems to be a small factor in cleanser sales. And few are surprised that P&G, now that it has debuted its cleanser, isn't stressing a money-saving theme in its promotion.

*United is a holding company, with interests in about 10 firms of varying types. This now includes insurance companies, dye works, even oil pipelines. Bon Ami is about the first firm with a line of consumer products, and though United doesn't have complete ownership, its holdings give it control.

Coming Up in Chicago

Five surveys of 1955 production of chemical specialties will highlight the 42nd annual meeting of the Chemical Specialties Mfrs. Assn. (Chicago) next week.

- Aerosols.
- Waxes and floor products.
- Brake fluids.
- Antifreeze compounds.
- Packaged insecticides.

Middle of the Road

Like other cities across the country this spring, Chicago is repainting its traffic lines. Repainting 650 miles of traffic lanes, 12,500 cross-walk lines and 3,698 stop lines, the city will use 25,000 gal. of paint.

While the city will be using tried and true road paint, the Chicago park department is in an experimental mood this year, will test two new plastic types in an effort to cut down on the $60,000/year it spends on the 1.9 million ft. of markings under Park Dept. jurisdiction.

The two new products:

- A product of Prismo (Huntington, Pa.), which is applied in a molten state, and is reflective.
- Permaline, by Zeon Chemical Co. (Long Island City, N.Y.), which is a plastic material in 2-ft.-long sheets that are bonded to the pavement.

Both of the new materials cost about 70¢/ft., compared with 3¢/ft. for the presently used paint, but the hope is that they will stand up long enough to prove more economical.

So far, little is known about the ultimate wearing qualities of these materials. About all that is known is that traffic can be driven over the sheet material 5 minutes after application, over the molten type in 40 minutes, over usual paint in 20 minutes.

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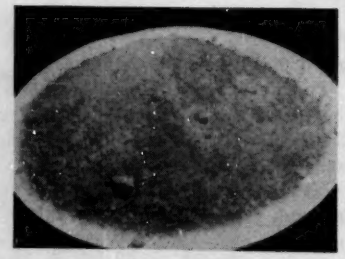
More Diamond products:

carbon tetrachloride; perchlorethylene; methylene chloride; methyl chloride; chloroform; Chlorowax® (chlorinated paraffin); muriatic acid; DDT; BHC, 15% and 40% gamma; Lindane; 2,4-D and 2,4,5-T amine salts, esters and formulations; grain fumigants.

Like more information

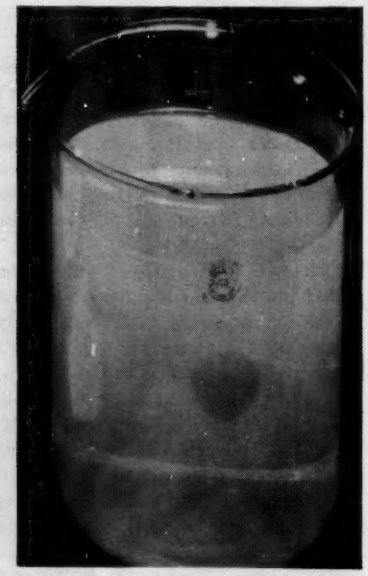
or technical help? Phone your DIAMOND man. DIAMOND ALKALI COMPANY, 300 Union Commerce Building, Cleveland 14, Ohio.

Diamond Chemicals





FINE powder (below), instead of coarse grains (above) helps sales.



PAYING the freight on 90% water is also a thing of the past.

Three Steps to Success

After a decade of getting slight attention, and winning puny sales, Cellosize, Carbide and Carbon Chemicals' hydroxy ethyl cellulose, has suddenly blossomed into a lustily selling specialty chemical.

Carbide is so pleased with Cellosize that it's now building (for '57 completion) manufacturing facilities in Niagara Falls to multiply its output. And just last week Carbide lopped about 16¢ off the pound price—Cellosize is now about $1/lb.

Behind the Cellosize success story is a fortunate pairing of circumstances. Carbide can claim half the credit, because it refined the cellulose specialty into a fine white powder of uniform quality—it had been introduced as a 10% solution in water, then improved somewhat to a coarse, brown grain (*see cut*). Of equal importance has been the growing popularity of polyvinyl acetate paints—3 to 5% of Cellosize serves as a freeze-thaw stabilizer and bodying agent for the paints, and it has been widely accepted by industry.

Indeed, it is the potentialities of the PVAc paint industry that have encouraged the big expansion in Cellosize facilities. But other uses—in textiles, paper, adhesives, cosmetics—are expected to take a solid share of future output.

Slow Growth: Hydroxy ethyl cellulose was commercially offered just after the war, though samples had been available since '42. Carbide itself used it for sizing applications, but few other firms could be induced to stick with it, in spite of its numerous valuable properties.

For one thing, the liquid varied considerably from batch to batch. And the price was substantial ($1.50/lb. on a 100% solids basis). Shipping charges discouraged more than one customer.

Too, first efforts to make a spray-dried material weren't too encouraging; the product was coarse, grainy, varied in quality. Then, last fall, the present white powder was made available. In the meantime, PVAc paints were catching on.

The net result has been most encouraging to Carbide. Sales last year were in the $0.5-0.75-million bracket, easily double '54's, and four times the consumption in '50. By 1960, Carbide sizes up the potential as about 6 million lbs./year, and it wouldn't be surprised if sales were double that. At last, a decade of faith seems to be paying off.

The "Precious Plus" that didn't appear on the Blueprints

You *see* reactors, vessels, towers and piping — and they have the familiar look of any other Paraxylene and Udex plant. But what you *don't see* — what blueprints cannot show — is the "Precious Plus" that earmarks this "a BMC project".

At the time BMC was awarded the design and construction contract, the client had *firm* commitments to ship paraxylene within a fixed time period . . . a time period that would require tight scheduling — even for *conventional* design and construction.

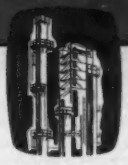
But there was nothing ordinary about *this* Paraxylene plant. It called for a unique crystallizing process — developed by BMC but never before used — that would require time-consuming creative engineering.

Working under almost prohibitive time pressures, a BMC Task Force — with the *Key Man* in charge — tackled the job. There was no waste motion in engineering. Drafting geared itself to a back-breaking schedule. Equipment orders were placed early. Usual "bugs" were anticipated — and avoided.

The plant went "on-stream" ahead of the client's *fixed* schedule . . . and first shipments were on their way well in advance of the contract commitments. Cost? Substantially below the estimate despite the emphasis on speed.

You can't see it . . . you pay nothing for it . . . but the "Precious Plus" included in this project is a part of every BMC proposal. Many leading petroleum and petrochemical companies have found it a distinct advantage in getting better plants, faster and at a lower cost. How else explain the unusual growth BMC is enjoying?

+ BMC's *Key Man* operation is unique among major contract engineering firms. The BMC man who submits your proposal is *always* a BMC principal . . . *always* the Key Man heading up the Task Force responsible for the execution of your job. Clients tell us "This is the BMC difference that makes the difference."



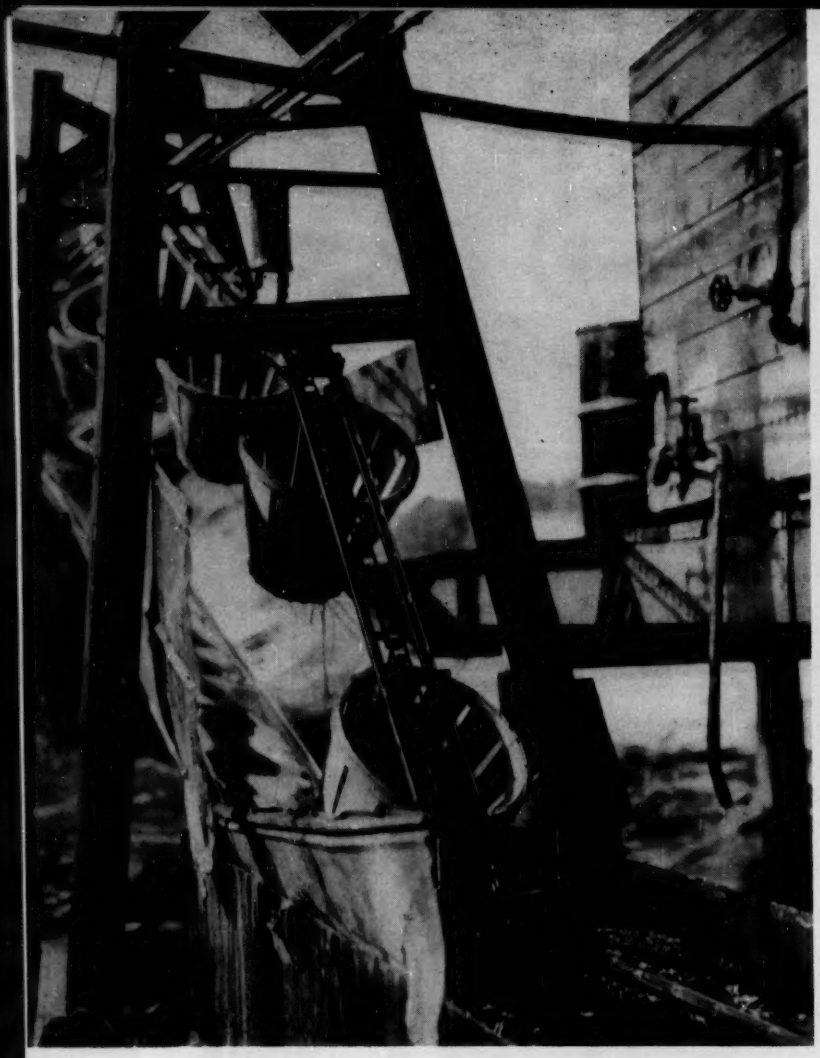
The Udex and Paraxylene Plants described here were designed and constructed for Sinclair Refining Company, Marcus Hook, Pa.

BMC

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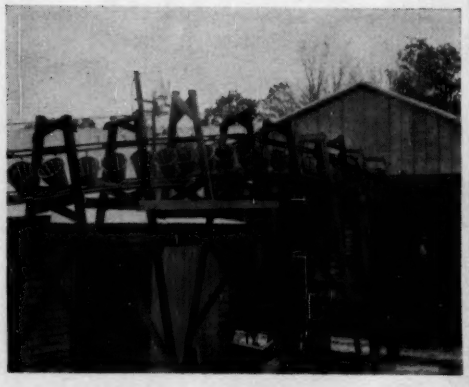




1 HOOKED onto conveyor, new baskets on their way to storage shed



2 SWOOP down for dip in copper-8 bath. After emerging, they'll be



3 FORTIFIED for several extra seasons of tomato packing.

Bathing Bushels Is a Booming Business

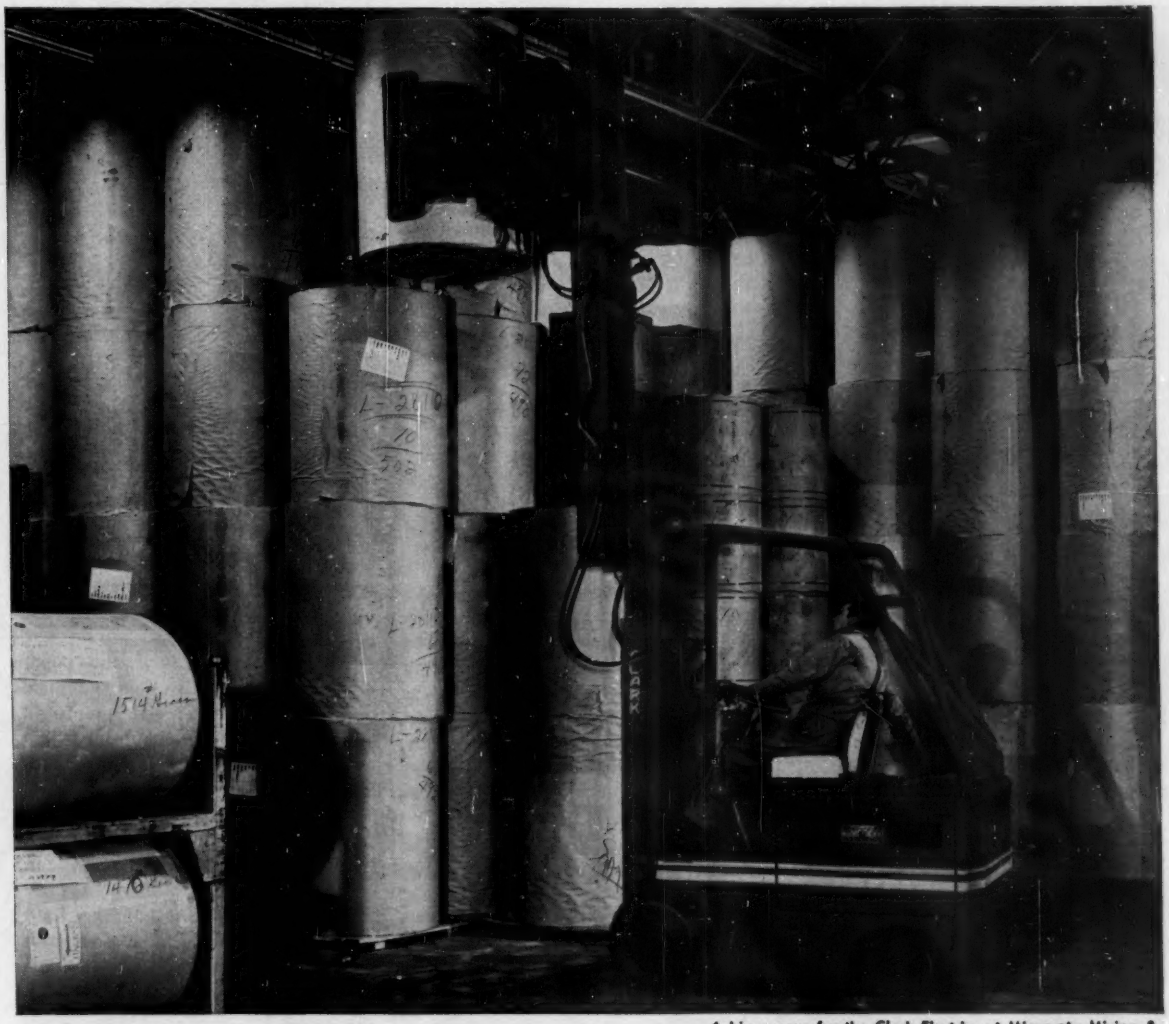
Basket, crate and box makers are now readying their wares for the 3.5 million tons* of tomatoes that will be picked this summer. But this year their preparations involve an extra step: treating the containers with a combination fungicide-water repellent.

The cost of replacing baskets and other fruit and vegetable containers lost through decay highlights a golden opportunity for fungicide makers. So far, however, no more than one-sixth of this potential $3-4-million market has been realized, due—according to the experts—to the lack of a truly satisfactory product.

Now, however, materials containing copper-8-quinolinolate are starting to catch on. Scientific Oil Compounding Co.'s (Chicago) Cunilate Wood Seal is snaring most of the market, on the strength of these properties: it's nontoxic; doesn't impart odor or flavor to the food; has no bad odor, itself; is highly effective; invulnerable to weathering; permanent; and does not harm the tensile strength of the wood fibers.

No Solution: Cunilate Wood Seal is the payoff on a promise of over

*Based on U.S. Dept. of Agriculture figures for 1954.



A big reason for the Clark Electrics at Minnesota Mining & Manufacturing Company is the dependable service offered by Material Handling Engineers, Minneapolis. This service is typical of all Clark dealers.

Clark Electrics at Minnesota Mining & Manufacturing

and there's a good reason . . .

They use a double upright in 3M Company's paper warehouse. Equipped with a rotating roll clamp, the Clark Electric will stack to 190 inches, yet go through a regular 74 inch door. A standard upright would require a down height of 120 inches. That's one answer, but why a Clark *Electric?*

Electric trucks move material at the lowest cost per ton mile—and with Clark Electrics, you get the electric truck with the power saving dual field motor that provides more ton-miles per battery charge.

But it takes more than features. How about 3 years from now, or 5 years, or 10? That's when you depend on service—fast, local service.

And that's where your local Clark dealer comes in. He offers prompt mobile service for emergencies, the largest supply of service parts in the industry—genuine Clark parts that are warranted and guaranteed for quality. And he provides a completely equipped shop for rebuilding, a fleet of rental trucks to help you over peak work loads. Fact is, he offers a complete service package. Look in the Yellow Pages under "Trucks, Industrial" for the Clark dealer nearest you.

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SPECIALTIES . . . . . .

10 years standing. Copper-8-quinolinolate, the active ingredient of Cunilate, was developed for the government by Monsanto in 1944. (Fisher Chemical Co., Inc., New York, has bought out Monsanto's copper-8 business and is now the major producer.) But it was kept out of food baskets by two serious shortcomings:

- It is practically insoluble in water, can only be applied as uneven dispersions—but a continuous, unbroken coating is required.
- It is not water repellent, a quality necessary to prevent leaching of the fungicide, as well as warping, swelling and shrinking of the wood.

In spite of these, however, copper-8 aroused considerable attention from the outset—largely because other fungicides and wood preservatives (copper naphthenate, creosote, pentachlorophenol) have even more faults. The government's Wright Field Fungal Control Unit tested copper-8 extensively, told SOCC it would be ideal if the solubility problem were licked.

SOCC solved this problem in 1948 with a technique it calls "solubilizing."* It devised a new product, comprising 10% copper-8, which is more effective than copper-8 alone, and—more important—is soluble in aliphatic or aromatic solvents.

Solublizing, in SOCC's case, consists of a double salt reaction with a metal octoate or other metallic soaps. After further processing, the resulting product can then be dissolved in a solvent or emulsified.

High and Mighty: The Quartermaster Corps, SOCC says, subjected Cunilate to rigorous tests, was happy with results. At the same time, the Surgeon General's office cleared it for use in low-toxicity applications, such as shoe linings, cot covers. The new product eventually gained a good reputation among government and industry people alike.

Cost, however, is relatively steep. Tailor-made for specific applications, Cunilate varies from $1-1.30/lb. This is in sharp contrast with copper naphthenate's tab: 25¢/lb. Both materials are used as fungicides. Unsolublized 100% copper-8, on the other hand, sells for more than $4/lb. Cunilate's price has dropped 30% since it was first introduced.

In spite of its relatively high price, the fungicide quickly found a lot of uses. It goes into webbing, rope, thread, vinyl plastics, garden hose, sporting goods, fish nets, paper products and adhesives. One of its biggest outlets is mildew-resistant paints for food- and meat-packing plants (sales here paved the way for the later basket-treating compound, which goes to many of the same customers).

Market on Paper: A big part of the potential market for all Cunilate compounds (5-7 million of a possible 8-9 million lbs.) is in paper products—which can't use the Wood Seal form. Under test in this connection are several promising applications: barrier paper for beneath basementless houses; sandbags (a 25¢ paper bag might replace a $3.10 jute bag).

Although the size of the paper market will keep straight Cunilate dominant over the Wood Seal form, the latter's market potential is by no means insignificant, says SOCC. Before the big firms in the food business got on the bandwagon, the market for container-treating compounds was about $500,000/year. Now SOCC can see it hitting $3-4 million. Already using the chemical are many big food canning houses, vegetable and fruit raisers, and commercial fish handlers. Recently, SOCC was approached by one of the biggest orange distributors, interested in treating its crates.

SOCC originated as a consulting laboratory and still maintains extensive consulting facilities for its customers. But, its manufacturing facilities have grown rapidly and it now claims to be able to quickly boost capacity of Cunilate to whatever is needed—to meet even its own optimistic estimates of fungicide demand.

*The Patent Office fought use of the word "solubilized." SOCC had to explain that Cunilate wasn't merely a solution or emulsion of copper, but was a totally new compound. SOCC now has patents 2,561,379; 2,561,380; and 2,608,556 on its material, and is the prime producer of the solubilized form.

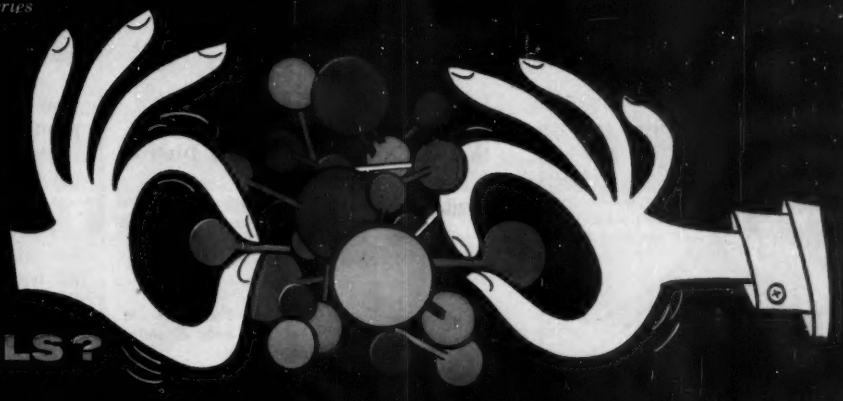
EXPANSION . . . .

Buys Fifth: Paisley Products, Inc. (New York) brings its total number of plants to five by buying the assets, business and production facilities of Dilco Products, Inc. (Redwood City, Calif.). The new San Francisco area plant will also act as a distribution and service point for Paisley's polyvinyl acetate emulsions and for the starch, dextrin and water-soluble natural gum products produced by Morningstar, Nicol, Inc., Paisley's

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- *Soil conditioners*
- *Dry fire fighting chemicals*
- *Ammonium nitrate prills*
- *Metallic and other soaps*
- *Insecticides*
- *Resins and plastics*
- *Granular high analysis fertilizers*
- *Sulfur*

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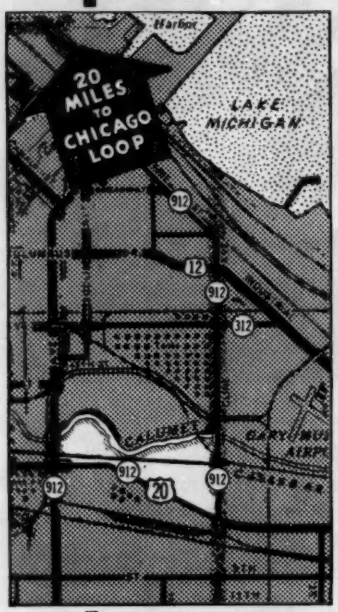
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Important dates in the History of Industrial Progress



1837

In electricity . . .

Thomas Davenport patented a device for producing rotary motion by constantly reversing the magnetic polarity of coils mounted on a shaft. It has been said that if the patent were still in force it would embrace every electric motor now running.

In the history of fats and waxes

Andre Gross founded the company that still bears his name. A. Gross & Company quickly assumed a commanding position in the infant fatty acid industry, but it is perhaps a more notable achievement that this leadership has been maintained throughout the 119 years in which the industry grew to its present eminence. Constant emphasis on technological progress is an important reason, and GROCO 2–RED OIL affords a typical example. Its properties reflect the care with which special purpose fatty acids are distilled in the modern Gross plant.

Send for samples and catalog "Fatty Acids in Modern Industry".

GROCO 2–RED OIL (OLEIC ACID)

Titre	3°C. max.
Cloud Point	38°F. max.
Color 1" Lovibond Red	2 max.
Color 1" Lovibond Yellow	15 max.
Unsaponifiable	1.5% max.
Saponification Value	198 – 203
Acid Value	197 – 202
% F.F.A. as Oleic Acid	99 min.
Iodine Value (WIJS)	96 max.
Refractive Index 50°C. (Average)	1.4505

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parent company. The present Morningstar-Paisley warehouse and office in San Francisco will be moved and consolidated into the Redwood City plant. The glues, pastes, and adhesives made by Dilco will be integrated into the Paisley Products line.

•

For the Calender: Textileather Division of General Tire and Rubber Co. (Toledo, O.) has broken ground for a $2-million expansion program. The new facilities will include a 33,000-sq.-ft. building, house a modern 92-in. calender for the manufacture of vinyl fabrics and vinyl sheeting. Completi n is scheduled for late summer.

•

St. Louis Buy: Hudson Chemical Co. has bought a one-story building in St. Louis for expansion of its power spray and ag chemicals divisions.

•

Swelling Sponge Maker: Hewitt-Robins, Inc. (Stamford, Conn.) will get into full-scale polyurethane foam production when it completes a 100,-000-sq.-ft. plant on 10 acres of land in Franklin, N.J. The company is now producing the foam at a temporary plant at Long Valley, N.J. The new plant, which is scheduled to be completed Sept. 1, will have an annual capacity of 2 million lbs., with room for future expansion. This will be the company's ninth plant (others produce foam rubber, conveyor belting, industrial hose, molded rubber products, conveyor and vibrating machinery, and power transmission equipment).

AEROSOLS . . . . .

Foothold in Dries: An aerosol foot powder for athlete's foot is being test-marketed in Columbus, O., by Lehn & Fink (Bloomfield, N.J.). Called Stride, the powder includes orthohydroxy-diphenyl and hexachlorophene. It dries immediately to a fine powder upon being sprayed on, providing a durable coating that lasts for 24 hours and is claimed to kill athlete's foot fungi on contact. The product sells for $1.69.

•

Fish Fooler: Five different aromas designed to attract trout, salt water fish, carp, bass and pan fish, and catfish, are available in an aerosol package to fishermen. The coating can be sprayed onto live or artificial bait, lures, flies and plugs and will cling to the lure through three to four

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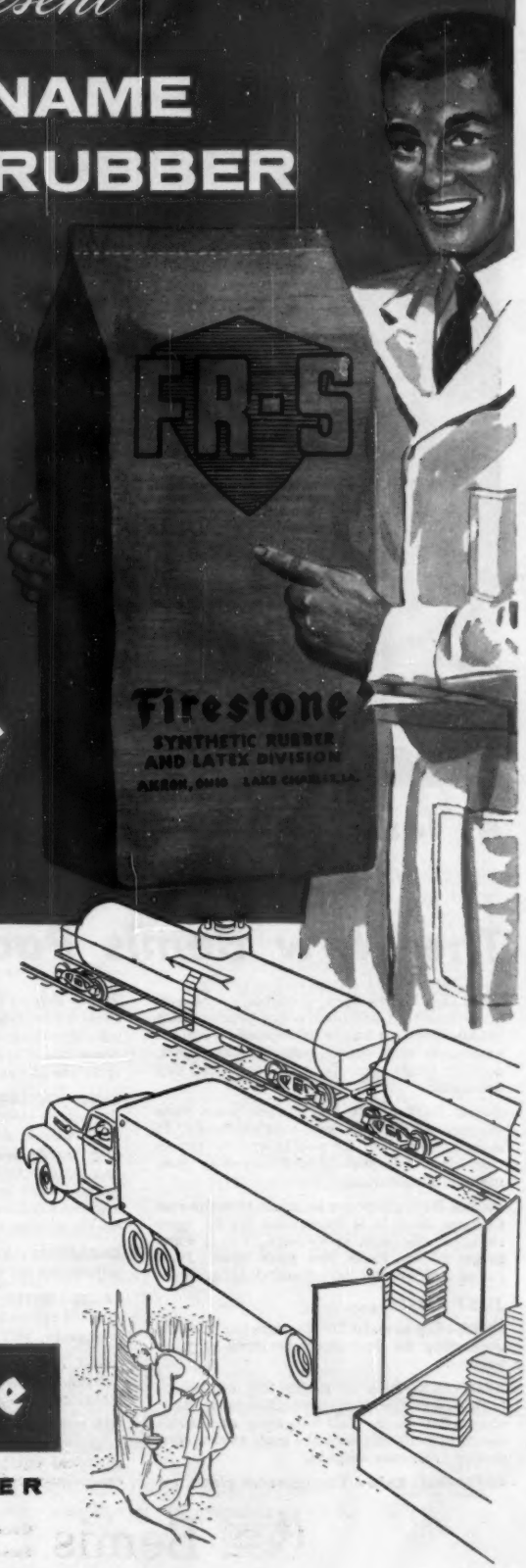
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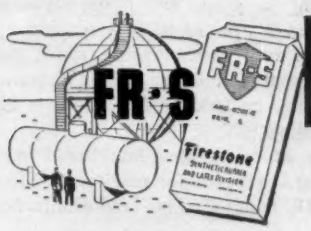
The World's Largest Rubber Producer



A new era is here—and with it comes a new name for a greatly improved rubber! More than just a new name, FR-S is Firestone's new HIGH STANDARD of synthetic rubber . . . already tested and proved . . . and now in large scale use in Firestone's own manufacturing operations.

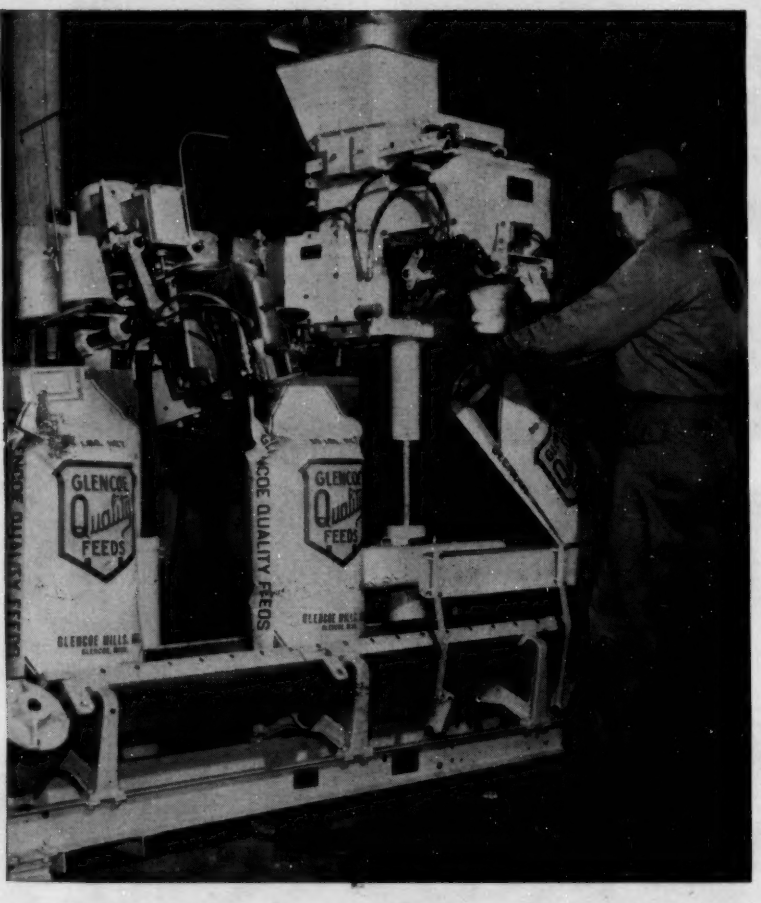
During the past year, every phase of Firestone's synthetic rubber manufacturing has been modernized. Raw materials must meet new, HIGHER STANDARDS. New, improved techniques; new measuring devices, and scientific methods of control have been added as plant capacity has been expanded.

FR-S is available in latex or dry rubber . . . in drums or tank car . . . bales or carload quantities. A Firestone Technical man will be glad to give you further information on FR-S and its applications. Phone or write Firestone, Synthetic Rubber and Latex Division, Akron, Ohio.



Firestone

BEST IN RUBBER



At last . . . big packer performance at little packer price . . .

The New Bemis Packer-Ette!

Here is a lightweight, portable, automatic performer that will handle any product that establishes an angle of repose. Typical examples: rice, sugar, corn, cracker meal, poultry feeds, granite grits, salt and dry chemicals.

Bemis Packer-Ette will reduce your costs through accuracy, speed and efficiency. It is just the packer for you in any operation that does not justify a heavy-duty permanent installation.

Packer-Ette gives you so many benefits and features that it is impossible to do more than hit the high spots here. You'll want to get all the facts. Ask your Bemis Man . . . or write us for folder and details.

JUST LOOK . . .

SPEED—Up to eight 100-lb. bags per minute, depending on flow characteristics of your product.

ACCURACY—Plus or minus 2½ ounces or better on 100-lb. bags, depending on product characteristics. Self-aligning and self-cleaning knife edges of the scale assure consistent, accurate weights.

OPERATING EASE—The operator places an empty bag on the filling tube and starts the cycle by depressing the foot switch . . . that's all. The bag holder opens automatically when the filling cycle is complete. All controls are at eye level.

BEMIS VICON® FEEDER—A unique means of moving products from supply hopper to scale beam; a two-stage pulsating feeder tray first feeds rapidly, then at a rate which can be controlled for accuracy. When the exact weight is reached, the feeder cuts off and the filled bag is deposited automatically on the sewing machine conveyor.

CAPACITIES—From 25 lbs. to 150 lbs. Easily adjustable for varying bag sizes.

TAKES LIMITED SPACE—Width, 26″; depth, 42″; maximum over-all height, 97⅝″; minimum, 76″.

LIGHT AND PORTABLE—Shipping weight, 600 lbs. Portable mounting for use in various locations.

NO INSTALLATION SERVICE—Just move it in and plug into a 110-volt, 60-cycle line. All electrical equipment enclosed in cast-iron explosion-proof boxes.

Bemis

General Offices—St. Louis 2, Mo.
Sales Offices in Principal Cities

hours of plug casting or one to two hours of trolling, the manufacturer claims. Called Odor Action, the product contains essential and aromatic oils. Robert J. Kerr Chemicals, Inc. (Park Ridge, Ill.) sells the product at $2.95 for 3 oz.

•

Dog Neutralizer: A spray to keep dogs from smelling doggy is being made by Whitmore Research Laboratories, Inc. (St. Louis, Mo.). The spray, Odor Off, contains a bacteriostat and a reodorant, can be used for spraying dogs and kennels, or on floors and rugs. Odor Off sells at 98¢ for 6 oz., or $1.49 for 12-oz. container.

•

Spray Polish: Claimed to be the first and only protective polish in aerosol form for automobiles is a new product called Liquid Glaze (Liquid Glaze Co., Lansing, Mich.). After cleaning the car, the user sprays the finish on his car, lets it dry and wipes it off. General Motors, Ford and Studebaker-Packard are offering it through their dealers under makers' names. The product was introduced last year in a 12-oz. size for $2.75, has just been made available in a 17-oz. size at $2.95. Sales so far this year are reported to show a 1,500% increase over last year's.

•

Lanolin Spray: Charles Antell, who has made much profit by pushing lanolin as a hair-saver ("You never saw a bald sheep"), now has the ingredient in a polyvinyl pyrrolidone hair spray. The product is being packed into three different sizes of Canco high-dome-topped, and recessed-bottom pressure cans: 2½ oz. (59¢); 4½ oz. ($1); and 11 oz. ($1.79).

PRODUCTS . . . .

Two for Farmers: Randox, a new weed killer from Monsanto, makes possible one-cultivation corn crops, the company claims. It kills germinating grasses such as crab grass, water grass and foxtails without harming corn (a grass itself) or soybeans. When it's mixed with water and applied as a pre-emergence spray, cost is about $4.50/acre. Final clearance for use on food or feed crops is still pending.

• More complete liquid seed treatment is claimed for new formulations of Du Pont's Ceresan seed disinfectant

SPECIALTIES . . . . .



Rough treatment proves



New Rheem-baked linings can take it

Traveling's hard on shipping drums – even when they don't show it.

Riding under a blistering sun one day, drums may be standing in snow the next. They get bounced and banged around – not always *hard*, but certainly *often*. All this shock adds up.

Rheem engineers stay a jump ahead of the problem. They speed up road abuse in "torture" labs by testing drums filled with actual products at various temperatures.

We've found that linings applied in extra-careful ways stand up better and longer under punishment. That's why we use 2-oven baking to cure our linings. Drums have a *"stand-up"* oven for more even baking. Their tops and bottoms have a separate oven. It's fussy detail, we know, but curing is a critical step in applying our linings. And we take lots of other fussy steps before the curing—like shot-blasting our steel drums to physically clean and roughen them—to give the linings a lasting, "fingered" grip.

These steps have all come out of a search for new and better linings – new and better protection – for all kinds of products. A *continuing* search by the world's leading producer of steel shipping containers.

E. D. C. B. A.

Have a hard-to-hold product? Chances are our lab has a lining just right for you. They have A to Z experience in solving lining problems. Write today.

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STREET_____

CITY_____ ZONE____ STATE_____

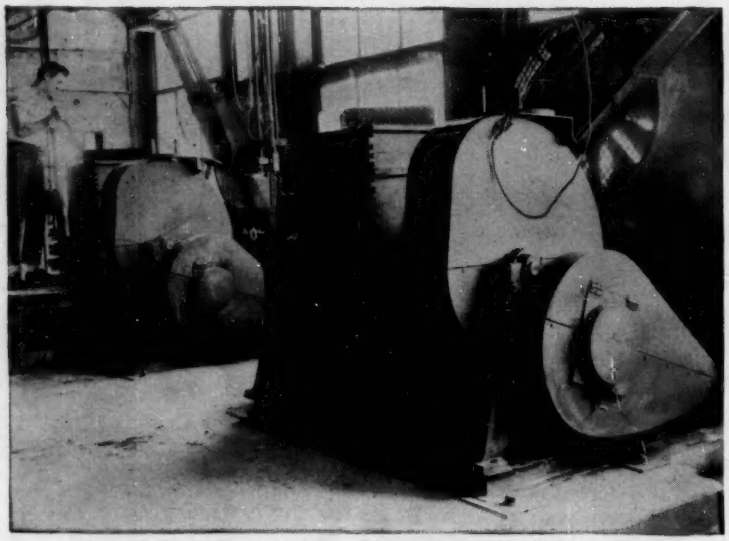
PRODUCT_____

CW-5

YOU CAN RELY ON Rheem MANUFACTURING COMPANY

RICHMOND AND SOUTH GATE, CALIF.; HOUSTON, CHICAGO, NEW YORK, NEW ORLEANS; LINDEN, N. J. AND SPARROWS POINT, MD.

CAN YOU PASS THIS



"it's three ways better at B. F. Goodrich"



#1 *It's faster* . . . delivers more production per hour.

#2 *It's efficient* . . . assures thorough dispersion of quality rubber doughs and cements.

#3 *It's safe* . . . special CO_2 seal on stuffing boxes (only 4 to 10 lbs. pressure) permits elimination of air from mix while protecting product from contamination by lubricants.

DAY IMPERIAL MIXER . . . built for heavy duty, engineered for precision, it incorporates many advanced engineering features to assure you high production at low cost. For complete details write for Bulletin 600.

FOUNDED 1867

in mixing equipment **DAY** *means longer life span*

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Division of Cleveland Automatic Machine Company

Quality equipment for baking, paint and varnish, printing ink, chemical, rubber, pharmaceutical, cosmetics, paper and pulp, explosives, food, ceramics, candy, soap, sugar and milk products.

Eastern Canada: Brantford Oven & Rack Co., Ltd., Brantford, Ontario
Western Canada: British Canadian Importers, Vancouver, British Columbia
Mexico: T. de la Pena e Hijos, S.A., Nazas 45-A, Mexico 5—D.F.

line. Based on a blend of two organic mercury compounds, which provide disinfecting vapor and long residual action, the treatment is formulated in different concentrations for slurry and liquid seed-treating equipment.

•

Joint Filler: A joint filler for quarry tile floors that's simply poured from a spouted tin can is available from Plant Maintenance, Inc. (Cleveland). The Poly-Rock Joint Compound is also claimed to be impervious to all known food acids, and most inorganic acids. It is sold in kit form, at $7.95 for a trial size.

•

Grip on Bleach: To fight competition from powder bleaches (sold largely on packaging-convenience appeal), Roman Cleanser Co. (Toledo, O.) has introduced a quart bottle featuring a large handle, and wide mouth for no-splash pouring of its liquid bleach.

•

No-Shrink Calk: A 100%-solid extruded calking compound that reportedly does not shrink after application has been developed by Parr Paint & Color Co. (Cleveland). Six years of development, just completed, saw the compound used to calk 7,000 metal panels in the curtain-wall construction of the still unfinished Socony-Mobil building in New York City.

•

Auto Shine: Fletcher-Hillyer Corp. (Minneapolis) has a new cleaning kit called Chrome Clean. For 98¢, the car owner gets an 8-oz. bottle of liquid cleaner (which cleans chrome chemically) and two pads of double "O" extra-fine steel wool. The maker says the cleaning leaves no scratches, no luster-hiding waxes, but does leave a rust preventive.

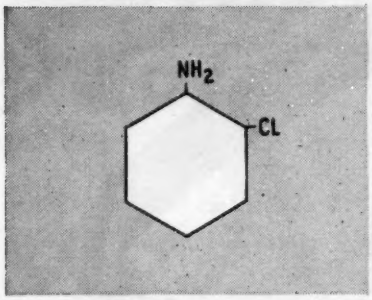
•

Two for Textiles: Germany has come up with two new textile treatment agents: a plasticizer and a detergent base. Soromin HT, a plasticizer with high-temperature stability, is suitable for avivaging spinning yarns that are subject to quick drying; it's applicable in a 4-11 pH range, allowing combinations with other finishing agents. Nekal BXW Paste, a synthetic detergent raw material (alkyl-naphthalene-sulfonate) has good wetting, foaming and dispersion features. The two are from Badische Anilin- & Soda-Fabrik AG. (Ludwigshafen).

TAKE A

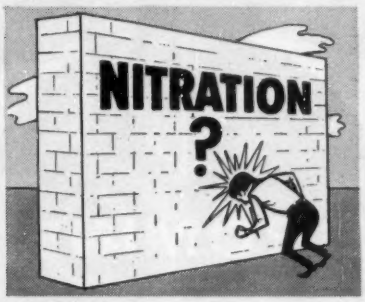
CAN YOU PASS THIS

30-Second Quiz on Intermediates?



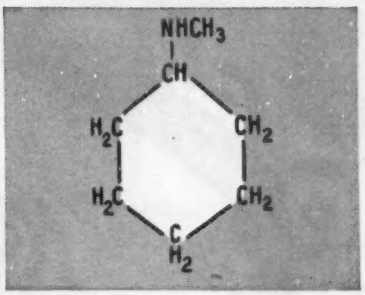
1. Du Pont o-Chloroaniline is currently used for:

- ☐ **A.** Preparation of fungicides
- ☐ **B.** Preparation of anti-oxidants
- ☐ **C.** No known uses



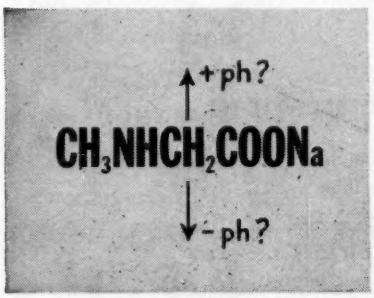
2. If you have a problem in nitration you should:

- ☐ **A.** Try Sodium Nitrate
- ☐ **B.** Pass the problem on to an unsuspecting friend
- ☐ **C.** Call on Du Pont for your nitrated products



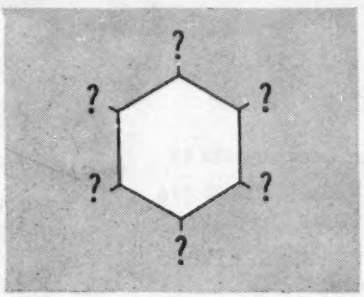
3. You can use Du Pont N-Methylcyclohexylamine as:

- ☐ **A.** A solvent
- ☐ **B.** An acid acceptor
- ☐ **C.** An intermediate



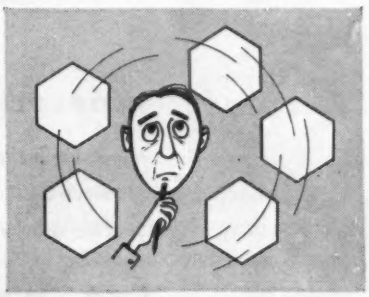
4. This is the formula for Du Pont Sarcosine. It is particularly interesting because:

- ☐ **A.** It displays both basic and acidic properties
- ☐ **B.** It is basic
- ☐ **C.** It is acidic



5. Suppose you have an unusual intermediate in mind. Your first move should be:

- ☐ **A.** Write Du Pont
- ☐ **B.** Consult Du Pont
- ☐ **C.** Call Du Pont on the phone



6. Granted there are a lot of intermediates to choose from. What's the best way to to find out about the one you want?

- ☐ **A.** Check all technical literature
- ☐ **B.** Write your problem up and send it to the ACS
- ☐ **C.** Write in to Du Pont

● Du Pont manufactures the greatest variety of intermediates offered by any chemical company and offers you help and advice on the use of any one of them. The quiz above gives some indication of the products and services available. Let's see how you made out on it: Answers: 1—A; 2—C; 3—A,B,C; 4—A; 5—Take your pick; 6—C.

There's a complete line of Du Pont intermediates containing nitro, chloro, amino and sulfo groups. Before attempting your own nitrations, chlorinations or reductions, it will pay you to consult Du Pont. Our resources are at your disposal in finding, or even in manufacturing, the intermediate you need.

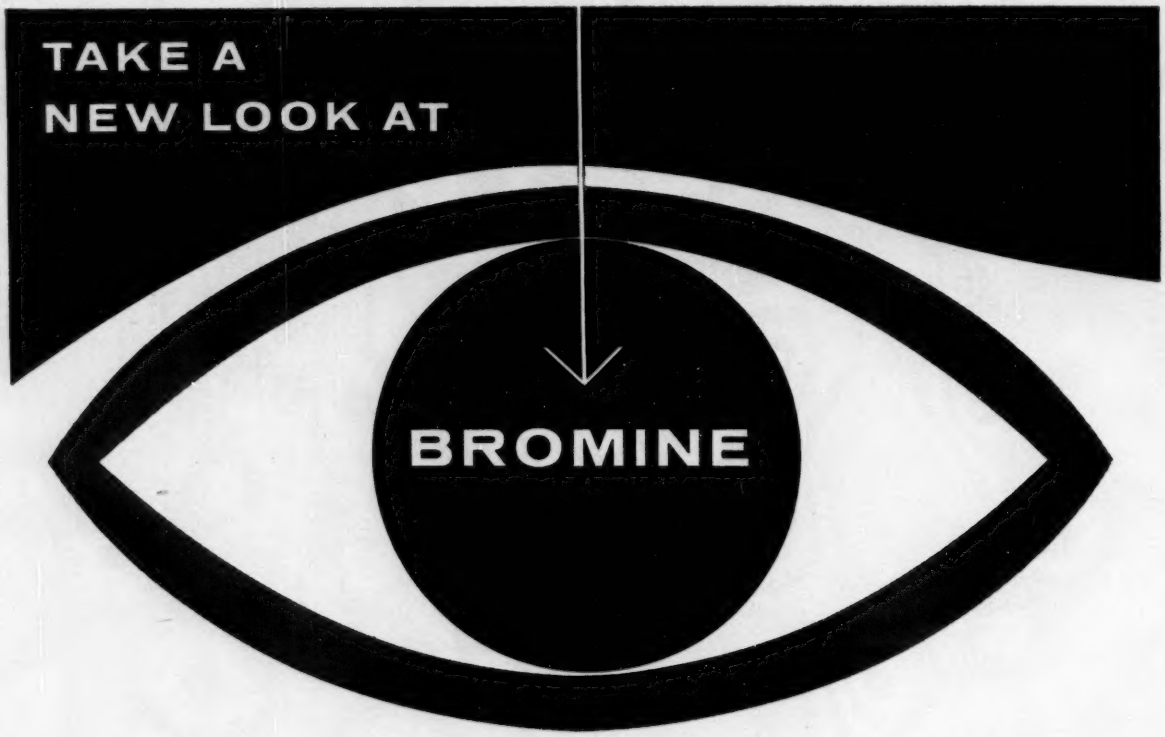
Just drop us a note, and let us try to help. Address: E. I. du Pont de Nemours & Co. (Inc.), Organic Chemicals Dept., Chemicals Div., Wilmington 98, Delaware.

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

ORGANIC CHEMICALS DEPARTMENT

TAKE A NEW LOOK AT



PROPERTIES:

Molecular weight	159.83
Atomic weight	79.916
Specific gravity at 20/15°C	3.120
Pounds a gallon at 20°C	26.0
Boiling point	58.8°C.
Freezing point	—7.2°C.

Freely soluble in alcohol, ether, carbon tetrachloride, chloroform, concentrated HCl, aqueous solutions of inorganic bromides.

SPECIFICATIONS:

Bromine, not less than	99.7%
Specific gravity at 20/15°C., not less than	3.1
Chlorine, not more than	0.15%
Iodine	None
Non-volatile, less than	0.01%
Water Content	0.003% Maximum

A NEW BROMINE PLANT* at El Dorado, Arkansas, will provide a large, dependable source of high-quality bromine at lower delivered cost in volume. This added capacity to our present production from plants at Saint Louis and Manistee, Mich. permits active research on this basic chemical element to take advantage of bromine's unusual and unique properties and characteristics. Investigate the possibilities of bromine and bromides in your business.

MC®

*A joint-venture project of Michigan Chemical Corporation and Murphy Corporation of El Dorado, Arkansas.

WHAT BROMINE OFFERS YOU

HIGHER YIELDS

Bromine compounds give higher processing yields in:

- Quarternary salt formations
- Williamson ether synthesis
- Alkylation of malonic or acetoacetic esters
- Reformatsky reactions
- Nitrile formations
- Hydrolysis to carbinols
- Ullmann reactions
- Grignard reactions in the aromatic series.

PROCESSING ADVANTAGES

- Oxidation potential of bromine is lower than that of elemental chlorine or fluorine. This minimizes decomposition of hydrocarbons in halogenation reactions.
- Melting points of bromides are higher than those of chlorides or fluorides. This usually makes isolation easier — an important advantage to the research chemist.
- Many reactions with brominated hydrocarbons may be carried out at atmospheric pressure and relatively low temperatures whereas the corresponding chlorides and fluorides require much more vigorous conditions to react. This may be an important processing advantage.
- Bromine is handled as a liquid — does not require pressurized equipment.
- Bromine compounds have exceptionally high densities — the highest of any organic compounds with few exceptions. This may be advantageous in processes involving liquid-liquid separations.
- The very low vapor pressure of brominated hydrocarbons may be an important advantage in some applications.
- Various inorganic bromides are useful catalysts in reactions involving intramolecular rearrangements.

NEW PRODUCT OPPORTUNITIES

- Bromine imparts greater fire resistance to organic compounds than low molecular weight halogens. This property has proved useful in fire extinguisher fluids and in fire proofing cloth. It might also have advantages in plastics.
- Bromine and compounds which readily release bromine are active germicides, bactericides and algicides.
- Bromine compounds are valuable in the manufacture of dyes because they impart unique color tones.
- New pharmaceuticals are possible with bromine compounds as intermediates.
- Bromine compounds are useful in the synthesis of photographic chemicals, vitamins, cosmetics and flavors.

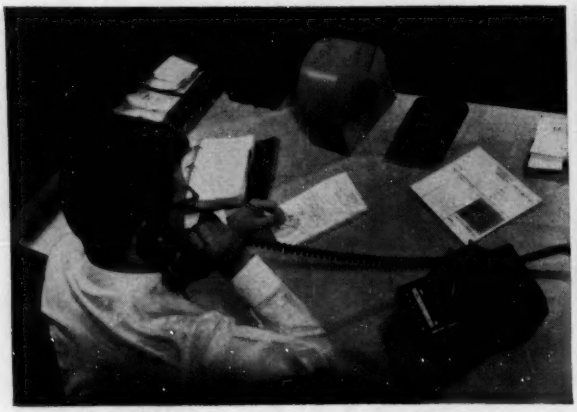
Michigan Chemical will be glad to aid you with your present bromide needs, or to help you in basic bromine research. Write or phone us.



C-56-8 *Reg. U.S. Pat. Off.

MICHIGAN CHEMICAL CORPORATION

516 Bankson Street, Saint Louis, Michigan
EASTERN SALES OFFICE: 230 Park Avenue, New York 17, New York



Tannery calls Merchants' Milwaukee office. A large order of assorted chemicals is needed immediately. Products of six different manufacturers are included. Can Merchants make rush delivery?



184-piece order is made up from stock at Merchants' adjoining warehouse. A large inventory is maintained to fill customers' daily needs.

rush order:

TEN TONS OF ASSORTED CHEMICALS



Delivery is made an hour and 30 minutes from the time order was placed. Ten tons, 184 pieces — delivered immediately from a *single source!*

Merchants makes delivery in an hour and a half!

Each Merchants' office is a single, reliable source for a wide assortment of chemicals. Because stocks at Merchants' warehouses are maintained with one consideration in mind — customer service — orders for assorted chemicals are filled rapidly and completely. For 35 years Merchants Chemical has given industrial chemical users this type of specialized service. Products include acids, alkalis, fungicides, surfactants, chlorinated solvents, emulsifiers, laundry compounds, soaps, dry ice and chemical specialties.

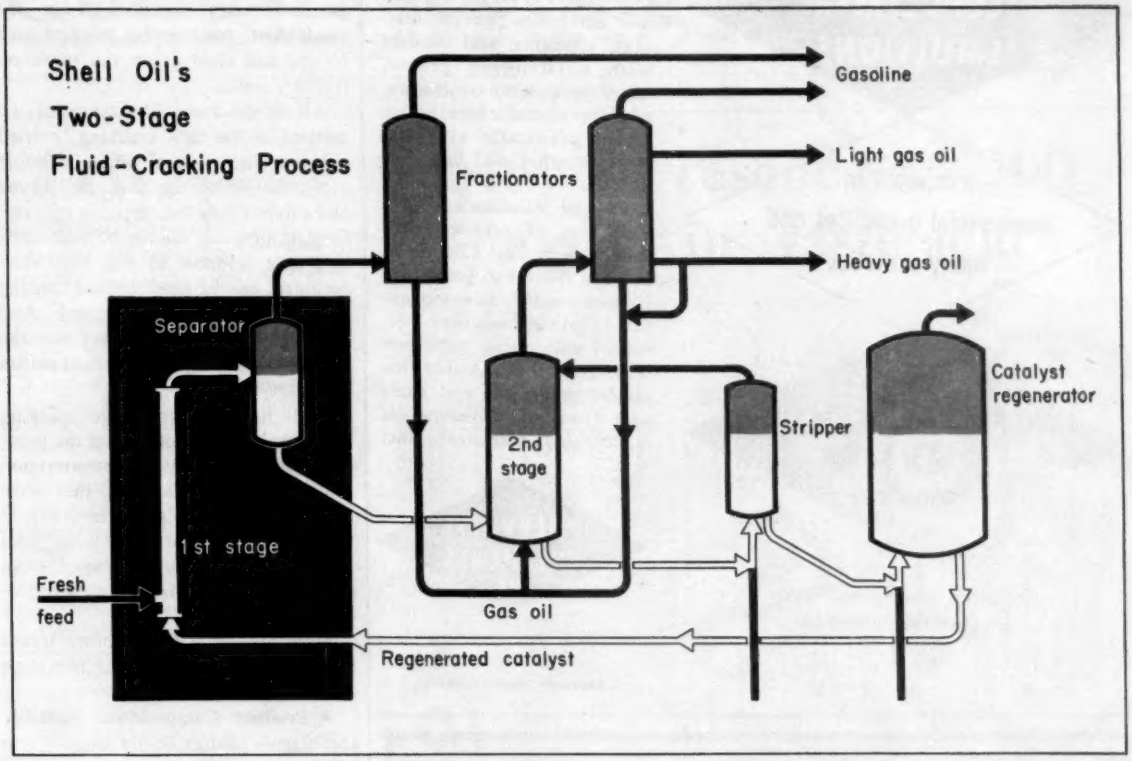
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Fluid Cracker Develops a One-Two Punch

Shell unveiled its highly touted, highly secret, two-stage fluid cat-cracking process this week at the American Petroleum Institute meeting in Montreal.

Basically, it's aimed at boosting yields of gasoline, cutting coke formation and giving the refiner more flexibility in his operations.

Here's how it works, what it means.

THE WELL-WORN theory that two light blows, properly delivered, can be a lot more effective than a single heavy one has had a tryout in petroleum processing. Shell Oil shunned conventional (one-stage) fluid "cat" cracking in designing its new Anacortes, Wash., refinery, decided instead on a two-stage process. The results were proudly put on display by Shell this week at the American Petroleum Institute meeting* in Montreal.

Shell had established the soundness of the two-stage approach in pilot operations at Houston. And industry was well aware that Shell had made a potentially significant advance in "cat" cracking technology. But for the most part, refiners are withholding judgment until they get a chance to study plant-scale results in some detail.

For its part, Shell has few doubts about the merits of the process. It points out that the Anacortes refinery has been operating since January, and reports the unit "has exceeded design expectations and has demonstrated its ability to operate smoothly without mechanical problems of any consequence."

Refiners still must be convinced that the increased efficiency of operations justifies the added investment. But they agree that the basic idea is appealing.

Three Ways Better: Big strides have been made in improving the fluid-bed technique since it was born 14 years ago. But methods of improving yields and selectivity have been confined to three areas: recycle of gas oil (to improve selectivity); high-temperature cracking (to decrease coke formation); segregation of the feed stocks (to enable each component to be cracked at something close to optimum conditions).

Shell concedes that recycle has been an important tool. But it reasons that increasing the temperature decreases coke formation at the expense of gasoline formation. Segregation avoids undercracking or overcracking to some extent, but Shell feels that segregation requires several units or extensive storage facilities.

*In a paper, "Commercial Two-Stage Fluid Cracking—A New Technique," by J. D. Heldman, F. Kunreuther, J. A. Marshall and C. A. Rehbein.

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NeoCryls . . . acrylic copolymer emulsions provide coatings, saturants, and binders with outstanding grease, water and scuff resistance, plus permanent flexibility under practically all heat, light, weather and age conditions.

One of America's largest producers of acrylic emulsions . . . Polyvinyl Chemicals, Inc. can deliver to your specifications swiftly in any quantity. Trained technical personnel will gladly show you why your best source for acrylic emulsions and their adaptation and development is Polyvinyl Chemicals, Inc.

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CHEMICAL GRADE MURIATE OF POTASH
62.73% K_2O (99.3% K CL) MINIMUM

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UNITED STATES POTASH COMPANY
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30 ROCKEFELLER PLAZA,
NEW YORK 20, N. Y.

PRODUCTION . . . .

Its answer: two-stage cracking. This provides an opportunity to crack the less refractory components of the crude first, remove the gasoline that forms, and then crack the more refractory units.

All in the Pipe: The secret of the method is the first cracking, carried out in a riser reactor, which is simply a pipe in which the vaporized crude and catalyst flow concurrently upward. Contact time can readily be held down to a few seconds, so that high temperatures can be used without hurting the gasoline that has formed. And the high temperatures decrease the formation of coke, which would poison the catalyst.

Shell has tried two-stage cracking on several crudes, found that the process gives appreciably higher conversion rates. In commercial runs, they have been as high as 75.4%. Generally, it found that conversions were well above what could be expected from single-stage cracking, even with recycle.

Here are some of the other things Shell has discovered about two-stage cracking:

- **Product Composition.** Probably the biggest change in the composition of the product is the increased percentage of ethane and lighter gases. The total amount of aromatics is comparable to that in products of one-stage cracking. But because of the increased conversion, the percentage of aromatics is lower.
- **Product Quality.** Although the composition of products made by the different cracking processes varies tremendously, the octane ratings don't differ significantly. Because of its high olefin content, the two-stage product is not as stable as the others. However, it can be inhibited to give a gasoline as stable as that from conventional cracking.
- **Process Flexibility.** By and large, two-stage cracking permits a high degree of flexibility in the operation. An important consideration: first-stage cracking at less than optimum conditions does not necessarily impose a heavy economic penalty, which means that the refiner can take into account the needs of downstream processing facilities in setting up the process.

Refiners are still taking a wait-and-see attitude about the merits of two-stage cracking. Shell is convinced that there's plenty to see right now.

Corrosioneering News

Quick facts about the services and equipment Pfaudler offers to help you reduce corrosion and processing cost.

Published by The Pfaudler Co., Rochester, N.Y.

IF YOUR PROCESS CHANGES THIS AFTERNOON

You can start a new process in 30 days!

An unusual plan is now in effect, to quickly help you throw production into high gear—even on a new process.

Standard designs of reaction kettles, tanks, heat exchangers and other Pfaudler equipment have been worked out to include many of the most-wanted features of custom-built equipment, such as a variety of openings on reactor heads, and removable tube bundles in heat exchangers.

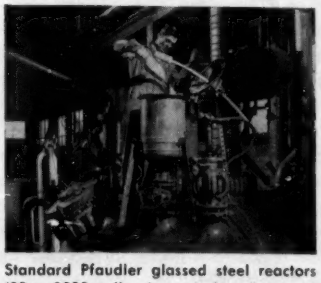
A stockpile of these standard-design units is built up, enabling Pfaudler to quickly meet your needs for standard equipment.

How this toothpaste company rushed new product to market

After exhaustive tests, one of America's biggest toothpaste companies decided to add a new ingredient to its product. The problem was to get the new product on the market as quickly as possible. The answer: by selecting standard designs, they got fast delivery of several huge Pfaudler glassed steel reaction kettles—direct from stockpile to their plant!

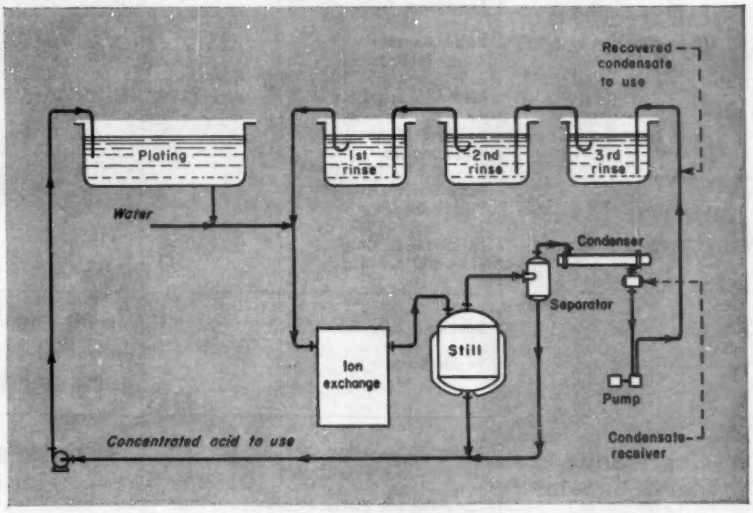
Polio vaccine producer got new kettle before written order was received!

Strange as it sounds, a glassed steel kettle was shipped to a producer of polio vaccine *before* Pfaudler received his written order! Recognizing his urgent need, the Pfaudler representative helped him select a standard design which would quickly increase his production. The order was telephoned. Within 10 days the equipment was on its way!



Standard Pfaudler glassed steel reactors (30 to 2000 gallons) are designed to meet a wide range of operating requirements, are stocked to make quick deliveries possible.

How to rescue $11,900 a year in waste acid



Flow chart for plating-plant operation, including plating and rinse tanks, ion-exchange, and recovery system.

If you plate with chrome, nickel, copper, silver, or gold, you can save up to 80% of your plating acid, with consequent savings of thousands of dollars a year.

A study of 30 leading plating companies revealed that a Pfaudler recovery system with a 500-gal. still could save an average of $11,900 a year, by removing water from dilute acids in the waste and providing a concentrated acid solution of plating strength. The system also returns the recovered distilled water to the rinse baths—a further saving.

Saved $42,000

In the midwest, a large user was losing 80% of his chrome acid down the drain. This was considered a reasonable record in the industry, but by installing a Pfaudler recovery system the company cut its waste tremendously, saving $42,000 a year!

Pfaudler recovery systems prevent the loss of the acid itself, and eliminate the need for chemically treating waste liquids to meet anti-pollution statutes.

Of tremendous importance in a system of this type is the material of construction used in the equipment. The hot, concentrated acid solutions are corrosive and might attack the equipment, contaminating wash water and making it unusable. To meet the rigid corrosion requirements of such solutions as 25 to 45% chromic acid, the Pfaudler system uses a glassed steel still and receiver. For other parts of the system, high-grade stainless steel units provide the proper protection.

Glassed steel provides a high range of corrosion resistance, allowing you to recover solutions of widely varying strength or content. It resists attack by all acids except hydrofluoric, and by alkaline solutions to pH 12 and 212° F.

If you plate with silver or gold, glassed steel provides an additional advantage. It prevents immersion deposits from forming as they might on steel vessels.

Several systems are offered as "packaged" plants—completely engineered, fabricated and delivered by Pfaudler ready to operate. You can operate by batches, semi-continuously, or with a fully automatic continuous system. Capacities range to about 2100 gallons per 8-hour day.

Further details on request.

PROCESS STREAM ANALYZERS

Instrument	Manufacturer	Analyzes	Cost
Mass Spectrometer	Beckman Instruments, Inc., Fullerton, Calif. Consolidated Electrodynamics Corp., Pasadena, Calif.	Most organic and inorganic compounds having a vapor pressure of more than 50 microns at room temperature	$5,000 to $40,000
Nondispersive Infrared Analyzer	Applied Physics Corp., Pasadena, Calif. Baird Associates, Inc. Cambridge, Mass. Beckman Instruments Leeds & Northrup, Philadelphia Mine Safety Appliances Co., Pittsburgh, Pa. Perkin-Elmer Corp., Norwalk, Conn.	Mixed gases, except mono-atomic gases and those that are highly corrosive	$2,000 and up
Dispersive Infrared Analyzer	Beckman Instruments Perkin-Elmer	Liquids and hard-to-handle mixed gases, except mono-atomic and corrosive gases	$5,500 and up
Continuous Refractometer	Barnes Engineering Co., Stamford, Conn. Consolidated Electrodynamics Phoenix Precision Instruments, Philadelphia	Binary or pseudobinary liquid mixtures	$4,000 to $6,000

They Take the Production Line's Pulse

You can't afford to operate a large-volume, continuous chemical processing plant for very long at less than peak efficiency. That single sentence largely explains the increase in the number and type of process stream analyzers. It's a trend that has closely paralleled the swing from batch to continuous processing. Available today are a number of instruments (see above) that, in effect, move the analytical laboratory right onto the production line.

Instrument engineers had gone about as far as they could go with devices that measure secondary variables—temperature, pressure, level, flow. To further improve process control, they needed a continuous supply of data on the physical changes occurring within the reaction products. Fast-acting mass spectrometers, infrared analyzers and refractometers now supply this information. And there's a promising array of new instruments seeking answers to the more elusive analytical problems.

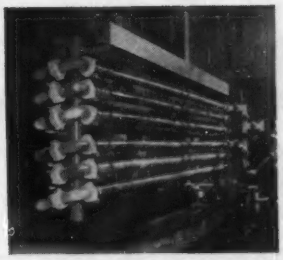
Ion Monitors: One of the most versatile instruments for continuous-process stream analysis is the mass spectrometer. Operating on the same principle as their laboratory forerunners, rapid-monitoring mass spectrometers analyze the ionic properties of stream components.

Samples, introduced in the vapor phase, are separated into groups of ions, which resonate in characteristic positions within a radio-frequency field. As the frequency is varied, the ions are accelerated toward a collector plate according to their mass. Measurement of the energy reaching the collector at the various frequencies provides a mass spectrum of the sample.

Though original laboratory instruments were limited to analysis of hydrocarbon samples, the newer modifications can handle almost any inorganic or organic compound that has sufficient vapor pressure (i.e., greater than 50 microns at room temperature) to enter the system. And this week, Consolidated Electrodynamics Corp. (Pasadena, Calif.) announced the development of a new portable unit that can analyze many compounds whose vapor pressure is normally too low for mass spectrometry.

Typical applications of process-stream mass spectrometers include analysis of:





SCALE DEPOSITS which impede heat flow do not form on the hard, smooth inside surface of the PYREX pipe in this heat exchanger.



You can see what's happening in PYREX brand glass fractionating columns. No corrosion. No contamination.

This pipe would last **203** *years*

on a diet of hot hydrochloric acid

Handling corrosive fluids may be forcing you to pay more than your share of industry's $6,000,000,000 annual bill for the perpetual war against rust.

PYREX brand "Double-Tough" glass pipe can help you cut your corrosion losses.

This pipe carrying 5% hydrochloric acid at 212° F. loses only .0003 inch of its thickness in a year. At that rate it would take over 200 years to eat away 30% of the wall thickness. It would take over 600 years to eat completely through the pipe.

PYREX pipe not only resists eating away by hard-to-handle fluids. It's also easy to flush clean. Even sticky substances and organisms won't adhere to its hard, smooth surface. Its transparency is often important, too. You can see what's going on inside—spot trouble in the making.

You don't have to worry about breakage. PYREX pipe is called "Double-Tough" because all fittings and flanged ends are tempered. This makes them 2½ to 3 times stronger than ordinary glass.

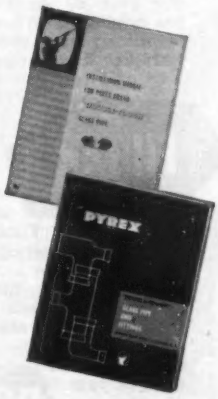
Easy to plumb

Your own men will find no difficult problems in installing and maintaining PYREX pipe. We maintain balanced stocks ranging in size from 1" to 6" I.D., including fittings to match the needs of most layout requirements and adapters for hooking PYREX lines in with other plant equipment.

FREE BOOKLETS: Send the coupon or write for copies.

This illustrated "Installation Manual" describes the simple procedures involved in laying out and plumbing PYREX brand glass pipe.

This catalog describes the full line of PYREX pipe and fittings, including spacers, adjustable joints, traps, and adapter connections.



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CEC considers the mass spectrometer the most versatile, most flexible instrument on the market. Models commercially available today can analyze up to 6 substances simultaneously, readily handle materials at all commonly utilized concentrations. Too, the fast response of the mass spectrometer is a big advantage—particularly in installations that utilize the output for automatic feed-back control systems.

The mass spectrometer also has shortcomings. For one thing, it can handle materials only in the vapor phase at essentially room temperature. And it still needs to be made explosionproof at a reasonable cost.

Prices of the various units depend on the modifications and installation required, are generally higher than other types of process stream analyzers. CEC offers installed systems ranging from $10,000 to $15,000; Beckman Instruments, Inc. (Fullerton, Calif.) makes a standard unit selling for $5,400, recently delivered to Oak Ridge 99 extremely accurate, high-mass analyzers that cost about $40,000 each. But as instrument manufacturers are quick to point out, the high initial cost is often justified by the mass spectrometer's unique performance.

Optical Operation: Another instrument that's finding numerous applications in the chemical process industries is the infrared process stream analyzer. Based on the optical properties of chemical compounds, infrared analysis monitors stream components by analyzing the characteristic absorption of infrared energy by key components.

Infrared analyzers can handle most industrial chemicals, except monoatomic gases (O_2, N_2, etc.) and materials that are too corrosive to be placed in the instruments. Typical applications range from detection of CO_2 (in ammonia synthesis) at concentrations as low as 0.2 ppm. to analysis of ethylene at concentrations of 75-100%.

One limitation on the use of infrared is interference caused by other materials in the process stream having an absorption spectrum very similar to that of the key component. Almost any material, other than the monoatomic gases, causes some degree of interference. In most cases, the effect can be minimized by utilizing that portion of the infrared spectrum where the interference is at a minimum. But it's almost impossible to eliminate the trouble when interference is severe, as in determination of butanes in the presence of isopentane.

Infrared analyzers are used to monitor up to 6 process streams by automatically switching from one continuous sample line to another in sequence. Only limitations on this type of multiple operation: instrument must analyze for the same component in each of the streams; analysis is intermittent (requires 1-2 minutes/stream) rather than continuous.

Cost of an infrared analyzer depends on the type of optical system used and special modifications required to meet given service conditions. Nondispersive analyzers—cheapest to manufacture, easiest to set up for complex gas mixtures—are priced from $2,000 up. Dispersive types (used for liquids and hard-to-compensate gas mixtures) offer more flexibility, sell for $5,500-$8,000.

Special Purpose Analyzers: In addition to the wide-range process stream instruments, there are several that perform vital control functions by utilizing a characteristic unique to a limited group of materials. One such instrument is the refractometer. Even though it is limited to binary (or pseudobinary) mixtures of liquids, the refractometer is one of the more important end-point analyzers currently used for continuous-process control. It's rugged enough to withstand rough use, can easily be made explosionproof, and requires no special skill to operate. Cost of installed refractometer systems ranges from $4,000 to $6,000.

A more recent addition to the line of onstream instruments is the ultraviolet analyzer. It is similar to the infrared analyzer in principle, but operates at the other end of the color spectrum, doesn't have as broad an application as infrared. Currently, ultraviolet is used to determine concentrations of butadiene, which, in normal mixtures, has a strong uv. absorption band. Price of the ultra-

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violet analyzer, available from Consolidated Electrodynamics, is $8,500.

Where flexibility is not required, single-purpose analyzers are often attractive alternates for more-versatile, high-priced instruments. For example, the oxygen analyzer manufactured by CEC costs less ($4,500), is more sensitive (20 ppm. on full scale with a threshold of 1-2%) than a mass spectrometer. But for speed, the oxygen analyzer's 10-minute response is no match for the mass spectrometer's instantaneous action.

CEC also makes an oxidizable sulfur analyzer that determines total sulfur, gives separate readings for hydrogen sulfide and mercaptans. Limitation: it doesn't distinguish between sulfur as hydrogen sulfide and sulfur as sulfur dioxide. But there are potential applications, says CEC, where this is no handicap, where the $4,000 price is attractive.

Another device that should give the higher-priced instruments a run for their money is the new dew-point moisture analyzer, developed by Du Pont and now moving into production at both CEC and Beckman. Now used for analyzing moisture in refrigerants, it costs less than $1,000, is sensitive to moisture at less than 0.1 ppm. or at more than 1,000 ppm.

More Coming: Now that analytical instruments have won their spurs on the production line, instrument manufacturers are concentrating on adapting more analytical procedures to automatic continuous operation. Development of a process gas chromatograph is already under way at Perkin-Elmer Corp. (*CW Technology Newsletter, April 28*). Beckman is currently developing an entire series of anion analyzers, based on its pH electrode system. It is also working on a flame photometer that, it is hoped, will do for inorganics what infrared has done for organic compounds.

The guiding philosophy behind the process stream analyzers was summed up quite well by Beckman's Henry Noebels: "It is no trick to control anything that we can measure and record. Anything that finds use in the laboratory—from a mass spectrometer down to a thermocouple—can be put into plant service. The trick is simply to design the instrument with a minimum number of component parts—and then to put the right instrument in the right place."

UV: New Vaccine 'Killer'

The most critical step in Salk vaccine production is the "killing" of the vaccine with formaldehyde. Give it a treatment that's not long enough, and you get a vaccine that actually causes the disease it's supposed to prevent. Treat it too long, and you get an ineffectual vaccine. Thanks to the sweat and toil of some of the country's top scientists and to one of the most rigorous sets of production controls ever established, this is no problem now.

But Parke, Davis felt there was still room for a more scientific approach. With the aid of a mechanical sterilizer developed by Franz Oppenheimer, of the Michael Reese Foundation in Chicago, the firm has worked up a vaccine-"killing" method that utilizes ultraviolet irradiation in conjunction with formaldehyde treatment. Last fortnight, it threw open the doors of its vaccine production unit at Rochester, Mich., to show visitors how its new method works. This is what they saw.

Perfect Balance: Vaccine to be "killed" is pumped into a perfectly balanced spinning cup. The spinning of the cup spreads the vaccine into a uniform, microscopically thin film approximately 0.0001 in. thick. Centrifugal action causes the film to rise along the cup's sides to the top rim, where it is drawn off by a specially designed collector. Inside the cup, radiation from six tubular ultraviolet lamps (*see photo*) hits the film, sterilizes the vaccine.

This treatment, supplemented by a brief exposure to formaldehyde, says Parke, Davis, kills every particle of virus "in less than one second without losing any of the vaccine potency."

Although the straight formaldehyde treatment as practiced by the other manufacturers of Salk vaccine has been perfected to the point where there's no danger of turning out a harmful product, Parke, Davis feels its combination attack has an advantage. It says that polio viruses can evade formaldehyde activity through a certain type of clumping. This explains the need for a great deal of filtration, which, according to Parke, Davis, tends to deteriorate the end-product.

Downtime for Development: Parke, Davis withdrew from the Salk production program last June, and its researchers went to work on the irradiation technique. They worked up the process, and the firm got back into production. But it takes between three and four months to produce and test the vaccine, and it wasn't until Feb. 26 of this year that the National Institutes of Health released the first batch of ultraviolet-treated vaccine.

The company is now feeding 2 million cc. into the cycle each week. It hopes to have 10 million cc. released for use by the end of June. By the end of September, it expects to have another 10 million cc. released. Finally, it hopes that before the end of the year it will have 10 million cc. more released. That would mean that the public would have access to 30 million cc. of irradiated vaccine this year.

Parke, Davis hopes to eventually produce 100 million cc. of vaccine per year. It should be remembered, however, that production figures for a product as demanding, from a control standpoint, as the vaccine are not necessarily synonymous with the amount that's released for sale.



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Three Methods of Measuring Salt—and Their Effects on Brine Uniformity

One of the most important factors in maintaining brine strength at consistently uniform levels is salt measurement. When measurement is inaccurate, brine may be weakened excessively or become too strong. But, when salt is measured accurately, variations in brine strength are virtually eliminated . . . brine production costs are reduced . . . and product quality remains high.

Today, there are three methods commonly used to measure salt in industry. While all of these have certain merits, only one method is completely accurate—measuring salt quantity in the form of saturated brine. A look at the other two methods will show why they are not entirely reliable.

Measurement by dry salt volume. This method presents a number of difficulties. First, moisture content of salt can greatly affect its volume. And humidity changes alter this moisture content to a considerable degree. Degree of compaction makes a big difference in volume, too. A pailful of salt may vary from 25 to 35 lb. (a 40% margin of error) depending on storage conditions, or length of storage. Both moisture content and compaction will change, not only from one day to the next—but also from one batch of salt to another.



Measuring by dry salt weight. This method is somewhat more reliable, but is still far from accurate. When the scale reads 100 lb., it can never be estimated how much of that weight is moisture—one pound or ten. And again, the moisture content of salt varies constantly with air humidity, and humidity of storage areas. When salt is measured this way, control over brine strength is never exact.

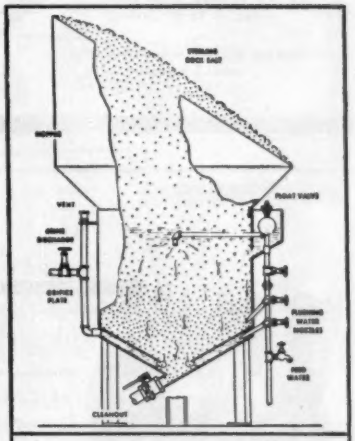


Measurement by the saturated brine method. This is effective in every industrial application. It depends, of course, on fully saturated, crystal-clear brine, free from any undissolved solids. One gallon of such brine always contains 2.65 lb. of salt (if dissolution water temperature is within the range found in most plants). By starting with this accurate fixed unit of salt measurement, brine strength can be completely controlled. Whatever strength is desired—the dilution of fully saturated brine with a certain amount of water produces it quickly and accurately.

One of the best ways to get the fully saturated brine essential to this measuring method is with a Lixate Rock Salt dissolver. This device—originated by International—automatically produces clear, fully saturated brine from Sterling Rock Salt. In fact, development of the Lixator made possible accurate salt measurement.



Regulating brine strength with the Lixator: Water is run into storage tank up to a specified mark. Lixate Brine is then added to bring the volume up to another mark. The mixture of water and Lixate Brine will give the exact strength of dilute brine needed—as well as the correct volume.



The Sterling Lixator reduces salt-handling, brine-making and brine-distributing costs. Savings between 10% and 20% on salt used are possible, too.

This method of salt measurement and brine control, of course, does more than protect product quality. It also provides substantial savings in time and labor—since the entire Sterling Lixator operation is fully automatic.



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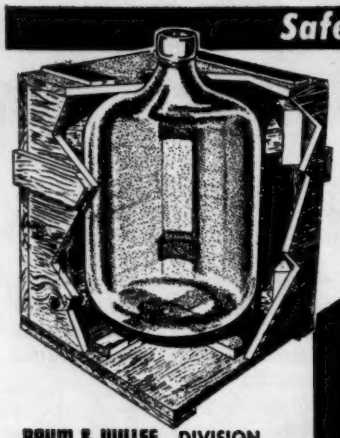
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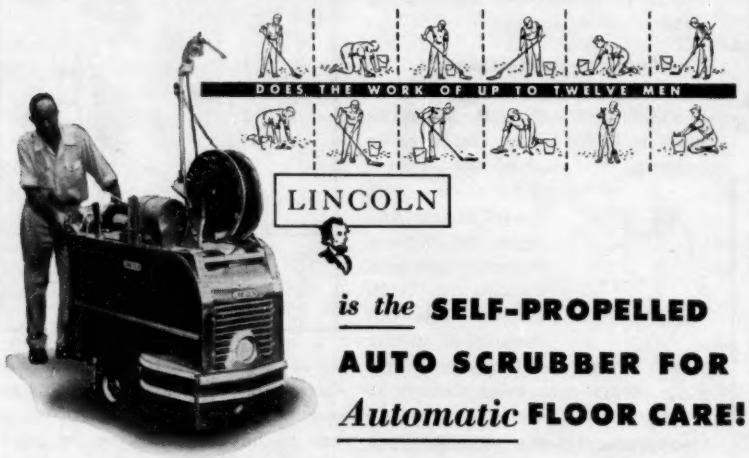
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PRODUCTION . . . . .

Home-Grown Diamond

General Electric's widely acclaimed process for making synthetic diamonds (*CW, Feb. 26, '55, p. 62*) kindled a spark of hope for U.S. independence of industrial diamond imports. Last fortnight, as the first man-made stones were being presented to Smithsonian Institution, that spark was fanned by the disclosure that the unique synthesis has been scaled up to pilot-plant proportions.

Site of GE's latest diamond prospecting venture is its Carboloy Dept. (Detroit). Limited quantities of industrial-grade stones are being made by subjecting a carbonaceous starting material to pressures ranging as high as 2.7 million psi., temperatures to 5000 F.

Details of the operation are still under security wraps, but J. S. Gillespie, manager of Carboloy's diamond project, reports "steady progress in bridging the gap between the first experiments and the production line." Dual objective of the pilot investigations: quantity production and achievement of a marketable price.

The U.S. currently imports about 90% of the 2-2½ tons of diamonds mined annually in Africa and South America, for which it pays more than $50 million. And 80% (by weight) of the industrial diamonds used in this country are of the sizes that can be produced readily by GE's synthesis.

"If the cost of man-made diamonds can be brought down below those now being mined," predicts Gillespie, "industrial diamonds could become a $200-million annual business within the next decade."

PROCESSES . . . .

Pulping By-Products: Processing of waste pulping liquors figured in the plans of paper manufacturers on both coasts this week:

• On the East Coast, the Brown Company (Berlin, N.H.) completed licensing arrangements to install Babcock & Wilcox Co.'s magnesium bisulfite pulping and chemical recovery process. The $3.5-million project, scheduled for completion in 1957, will process 750,000 lbs./day of waste liquor solids, will produce 160,000 lbs./hour of steam (at 825 F) from recovered heat.

• On the West Coast, Crown Zel-

lerbach started up its Camas, Wash., pilot plant to produce dimethyl sulfide from kraft black liquor *(CW, Jan. 7, p. 50)*.

•

Chromic Recovery: Mutual Chemical Division of Allied Chemical & Dye (New York) has just received a patent (U.S. 2,733,204) on a new method of recovering spent chromic acid solution from exhausted metal-treating baths. The process utilizes an ion-exchange treatment to remove metallic contaminants by passing the solution through a cation-exchange resin. The resin is a sulfonated infusible polymerizate of a polyvinylaryl compound. The treatment on a hydrogen cycle permits recovery of baths that become inoperable due to excessive metallic contamination or reduction in acidity.

In relatively large operations, the process is useful not only for the recovery of chrome values, but also as a means of reducing costly waste treatment of the spent solutions. It will be generally available for industrial use without any formal licensing agreement.

EQUIPMENT . . . .

Miniature Rectifiers: Now in production at Texas Instruments Inc. (Dallas, Tex.) are 1,500-volt, single-junction, miniature rectifiers for use where tiny high-voltage power supplies are required. Available in two types of axial and stud half-wave models and a full-wave plug-in model, they eliminate the need for filament power, several lower-voltage cells in series. They're designed for stable operation up to 150 C and forward current ratings up to 100 ma.

•

Flow-Ratio Control: Leeds & Northrup Co. (Philadelphia, Pa.) has engineered a flow-ratio control system said to hold the ratio of two liquid flows to 0.5% accuracy. The system permits continuous mixing of liquids, is particularly suited for small additions to main stream flow.

•

Air Filter: Oil vapor, moisture and foreign particles may be removed from compressed air and gas lines with the Sta-Dri filter now offered by Beach Precision Parts Co. (Boonton, N.J.). The unit utilizes a highly absorbent, cellular material that resists

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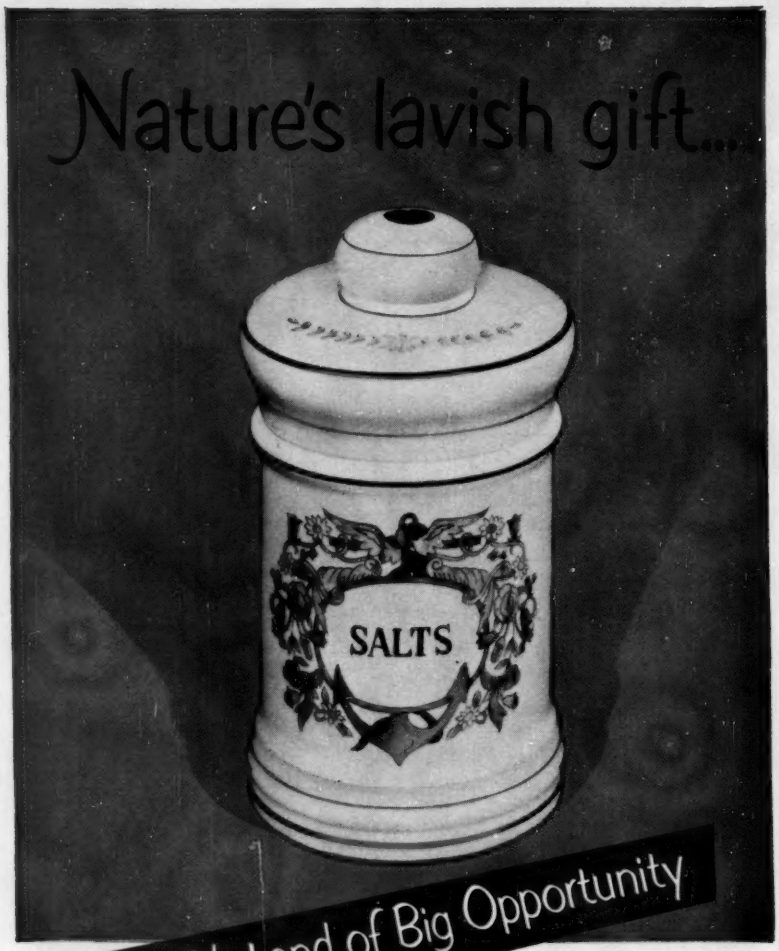
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Air Sampler: Mine Safety Appliances Co. (Pittsburgh, Pa.) offers a new type of instrument for collection of airborne contaminants to be weighed and analyzed in connection with industrial hygiene and air pollution problems. Called the M-S-A Fixt-Flo Air Sampler, it features an automatic flow control, compensates for filter resistance changes caused by collected material. Sampler is small, weighs 13½ lbs., operates on 110-volt, 60-cycle power.

●

Interchangeable Coupling: Packless Metal Hose, Inc. (New Rochelle, N. Y.) has redesigned its bronze flexible hose couplings to permit interchangeable use with either annular or helical hose. Couplings are packless and reusable. PMH couplings and braided flexible hose, in mill lengths, may now be ordered separately, speedily assembled to desired length as required.

●

Leak Preventive: A new tank-lining material to protect ferrous metal and poured concrete tanks from petroleum product leakage is supplied by The H. B. Davis Co. (Baltimore, Md.). Called Tanktite, it comes in emulsion form, supposedly eliminates toxic solvents and fire hazard during application. Davis recommends a minimum of two coats for ferrous metal, four coats for poured concrete, spray- or brush-coated as desired.

●

Automatic Speed Control: Reeves Division, Reliance Electric and Engineering Co. (Columbus, Ind.), is offering a new automatic control for its fractional series of Vari-Speed Motodrives. Previously available only on 1- to 40-hp. Motodrives, the control is actuated from any pneumatic instrument that produces signals of 3-15 psi. air pressure.

●

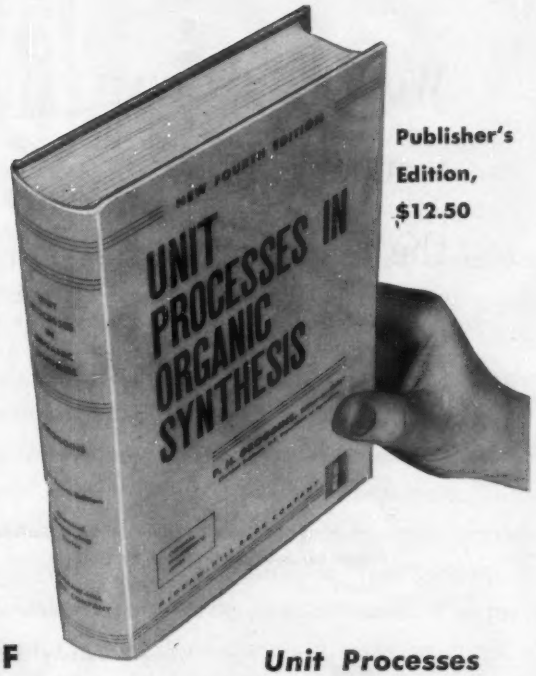
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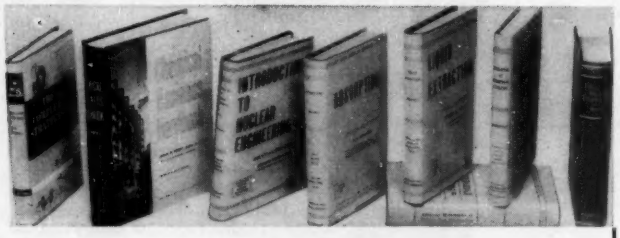
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•

Combination Respirators: Four new respirators have been added to the American Optical Company's (Southbridge, Mass.) R5000 series. All are claimed to protect against inhalation of volatile and nonvolatile airborne matter. The new cartridge elements fit AO's regular respirator face pieces.

•

Gas Pump: The Dexter-Conde rotary pump, now available from Dexter Folder Co. (Pearl River, N. Y.), is designed for vacuum and/or pressure applications in handling steam and various gases carrying entrained moisture. Made of corrosion-resistant bronze, the pump is equipped with Graphitar sintered-carbon vanes that require no lubrication, reportedly eliminate danger of sparks and explosions. Three models cover the capacity range of 3.5-33 cfm, operate at pressures to 20 psi.; they are said to give steady vacuum to 20-in. Hg. and intermittent vacuum to 25-in. Hg.

•

Roller Chain: For low maintenance and long service life of roller chain in chemical, petroleum and other types of corrosive service, Atlas Chain and Mfg. Co. (West Pittston, Pa.) offers its new electrolyzed roller chain. Made in all standard sizes, it's reputed to be cheaper, stronger than stainless steel chain of comparable size.

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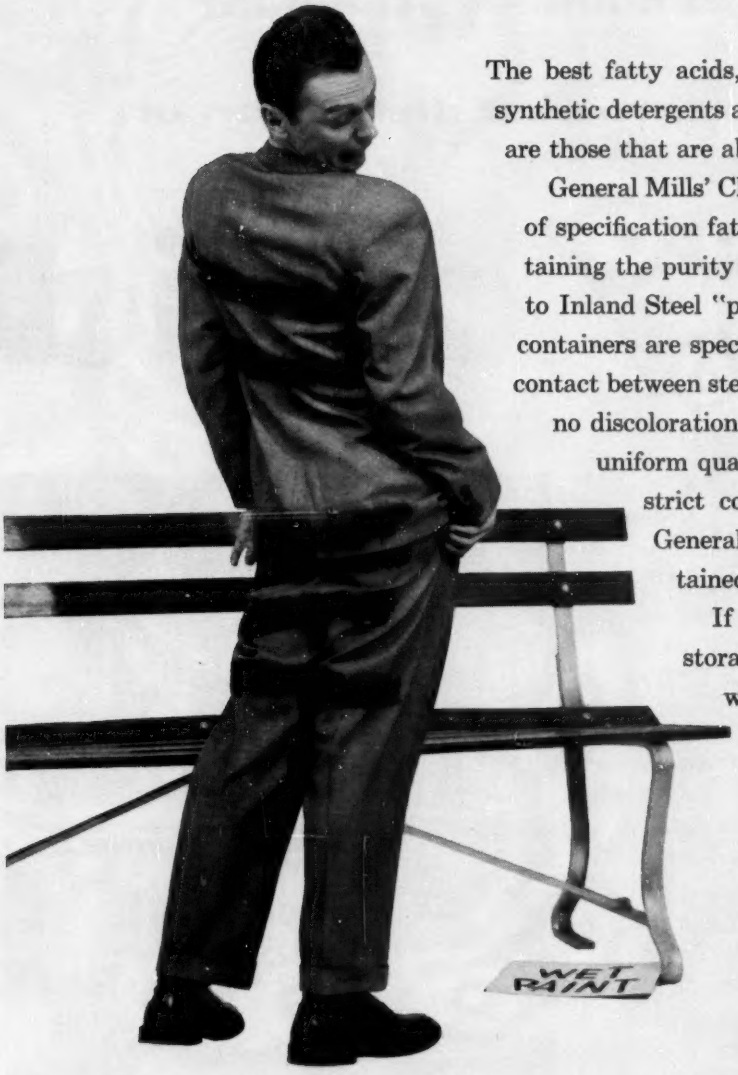
In-the-Line Filter: Hoke, Inc. (Englewood, N.J.) is out with a new series of brass and stainless steel line filters designed to remove foreign particles (larger than 5-12 microns in size) from small fluid streams. Intended to prevent valve clogging, the filters come in ⅛- and ¼-in. female pipe sizes with replaceable bronze filter elements.

•

Hydraulic Valves: Allied Chemical's Semet-Solvay Engineering Division (New York) has developed a new line of hydraulically operated gate valves ranging from 24 to 72 in. in diameter. The hydraulic mechanism permits one man to open a 72-in. valve manually in 17 minutes (handwheel operation takes 6 men 2 hours) or, with the aid of a small motor-driven pump, in 2½ minutes. Valves are fabricated from welded or stainless steel, special alloys.

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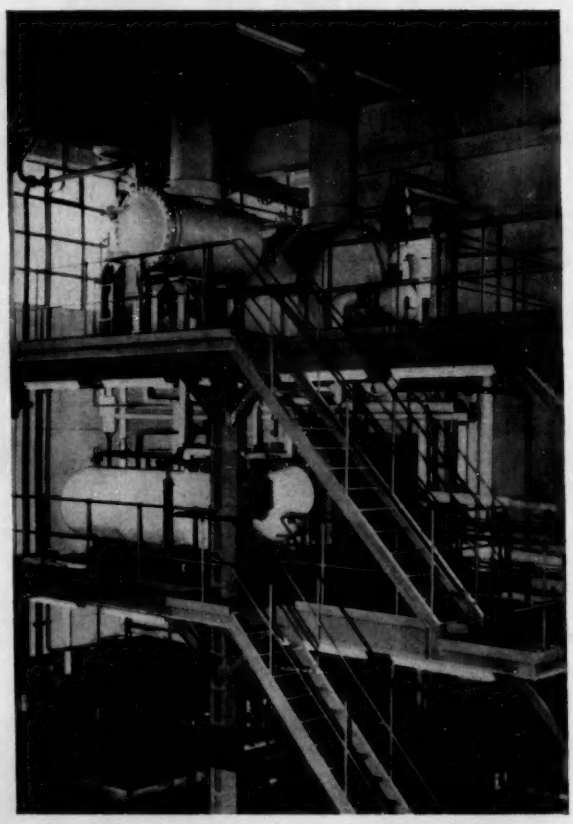
IN MONTEVIDEO...

another plant for low-cost distillation of

fatty acid

NEWEST ADDITION to the World Roundup of FW fatty acid processing units—the distillation plant shown here was built for Compania BAO, Montevideo, Uruguay. Designed and engineered by Foster Wheeler, this plant has a rated capacity of 1500 lb per hour of crude fatty acid.

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Interior of Compania BAO fatty acid distillation plant, showing still and main condenser on upper level and product receiver directly below. This FW-designed plant processes 1500 lb of crude fatty acid per hour.

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Market
Newsletter

CHEMICAL WEEK
May 19, 1956

Nickel continues to be one of the hottest topics in Washington this week. And the latest developments (*for more on nickel see p. 154*) are also aimed toward easing the plight of the long-time-strapped nondefense consumer.

To word that the government is considering the establishment of a new capacity goal that would boost the nation's future nickel supply 30-50% (100-150 million lbs./year), you can add this immediate relief action: some 40 million lbs. of the metal will be diverted to producers of civilian goods in the last six months of this year.

Elaborates ODM's chief Arthur Flemming: half the 40 million—much of it originally earmarked for government stockpile—will be made available in each of the final two quarters.

The new order will bring the total amount of such nickel diversions to industry to 74.3 million lbs. in '56—probably not enough to satisfy all needs, but somewhat more than was funneled to "civilian" users last year.

On the other hand, copper "repayments" are to begin soon. Along with the nickel announcement, ODM lined out a program for the "orderly" delivery to the government, over the next 18 months, of 40,000 tons of copper that was sidetracked to civilian users in the past year to help alleviate industrial shortages.

Here's ODM's guide to the General Services Administration for working out repayment schedules with contractors: about 7,600 tons during the third quarter of this year and 11,200 tons in the fourth; in 1957, these quarterly tonnages: 9,800, 6,200, 2,300, 1,900.

That adds up to only 39,000 tons, but GSA will collect the added 1,000 over the 18 months.

Incidentally, ODM, at this time, contemplates no further deferments of copper deliveries.

•

Generally speaking there's a snappy pace in today's chemical market. But this tempo, by contrast, spotlights the few commodities that are dragging along. Toluol is one. Naphthalene is another. And, of course, ammonium sulfate.

By this week, U. S. Steel's $10-13/ton slashing of coke-oven ammonium sulfate's price (*CW Market Newsletter, May 12*), has been emulated by others—but with an additional bargain twist. It's reported in the trade that some steel producers are making the new bulk quotation ($32/ton, f.o.b. producing plant) retroactive to April 30 and May 1 shipments.

Peak steel production in this country is also having an adverse effect, at least in some areas, on naphthalene sales. Stocks are backing up at the producers' level. And that's a decided switch from the market condition prevailing just a few months ago, when phthalic anhydride makers couldn't get enough naphthalene for their requirements.

But naphthalene producers aren't discounting the probability of supply troubles returning—and soon. Why? Current demand, they say, is being supplied partly by heavy imports coming in under old contract commitments—a source that may peter out—and by the unprecedented steel production in the U.S., which could be adversely affected by upcoming labor negotiations.

As for toluol, particularly coal-tar material, production continues to outpace demand, although domestic consumption is by no means light, and exports show little sign of falling off. Again, high steel output is the reason for the climbing stocks of unsold material.

There's a softness reported in petroleum-derived toluene, too, but the picture isn't as bad as it is for the coal-tar product, since output of the former can be controlled.

Despite the less-than-sparkling toluol outlook, though, don't expect any significant price changes in the near future. Sellers, at the moment, are reluctant to budge from current quotes.

•

A new revision in the directive covering GSA procurement of stockpile materials for the current fiscal year may mean a boost in business for some domestic producers. The change suspends further purchases of foreign fluorspar and antimony, for example, until the agency has determined the possibility of buying additional quantities domestically.

Fluorspar producers here, of course, have long been piqued by climbing imports (*CW, Nov. 19, '55, p. 119*), contend that U. S. reserves are now the largest in history. And, they add, these would be expanded if prospects of profitable operation were better.

•

Down again are prices on titanium sponge and mill products. The latest cut, fourth in 14 months initiated by Titanium Metals, will lop 20¢/lb. off the sponge and about 6% off mill items. All orders and commitments on the company's books will be affected.

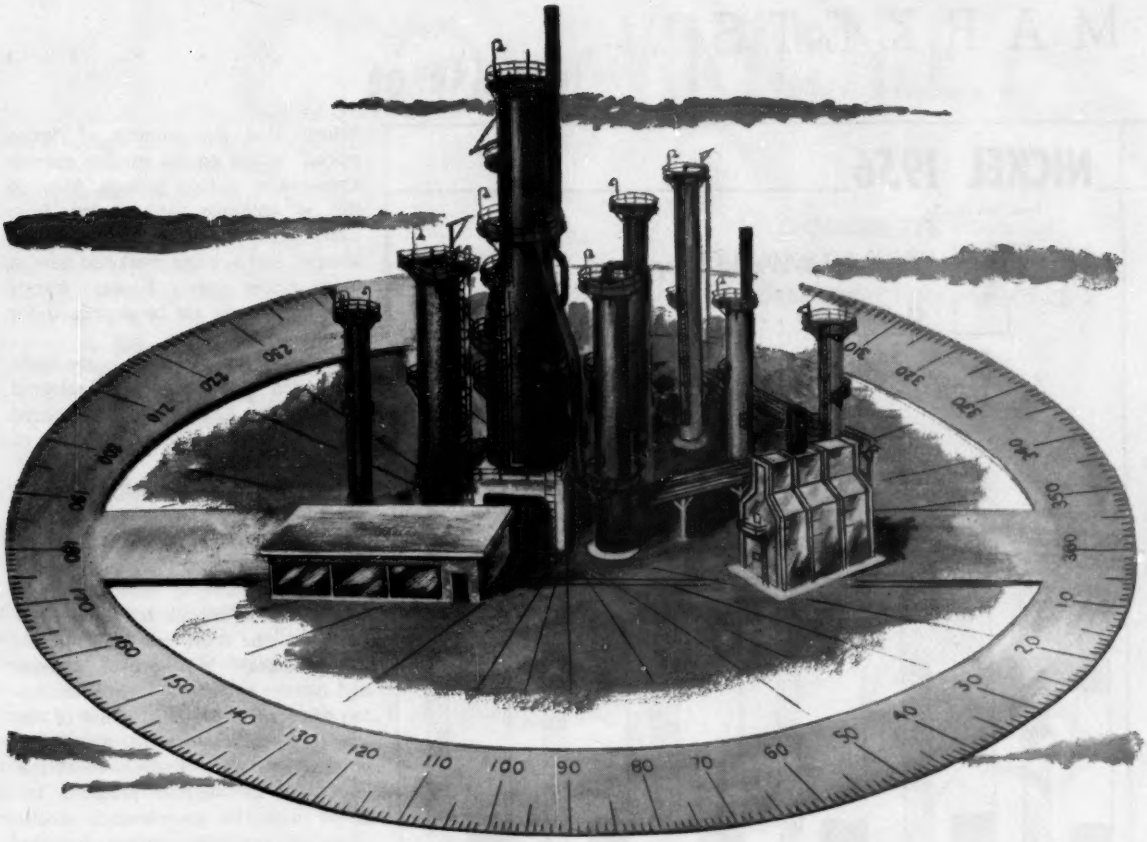
Repricing of backlogged orders alone, says Titanium, will save builders of aircraft, jet engines and guided missiles more than $2 million.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending May 14, 1956

	Change	New Price
UP		
Benzene hexachloride (BHC), low-gamma, dms., c.l., dlvd., gamma unit-lb.	$ 0.0005	$ 0.0075
Tankage, Chicago, bulk, per unit-ton	0.25	5.50
Tin, metal, Straits	0.0085	0.975
DOWN		
Ammonium sulfate		
Coke oven, bulk, base price	$10.00	$32.00
Synthetic, bulk, c.l., works	10.00	32.00
Tallow, inedible, extra, tks., dlvd.	0.00250	0.07375

All prices per pound unless quantity is stated.

MARKETS



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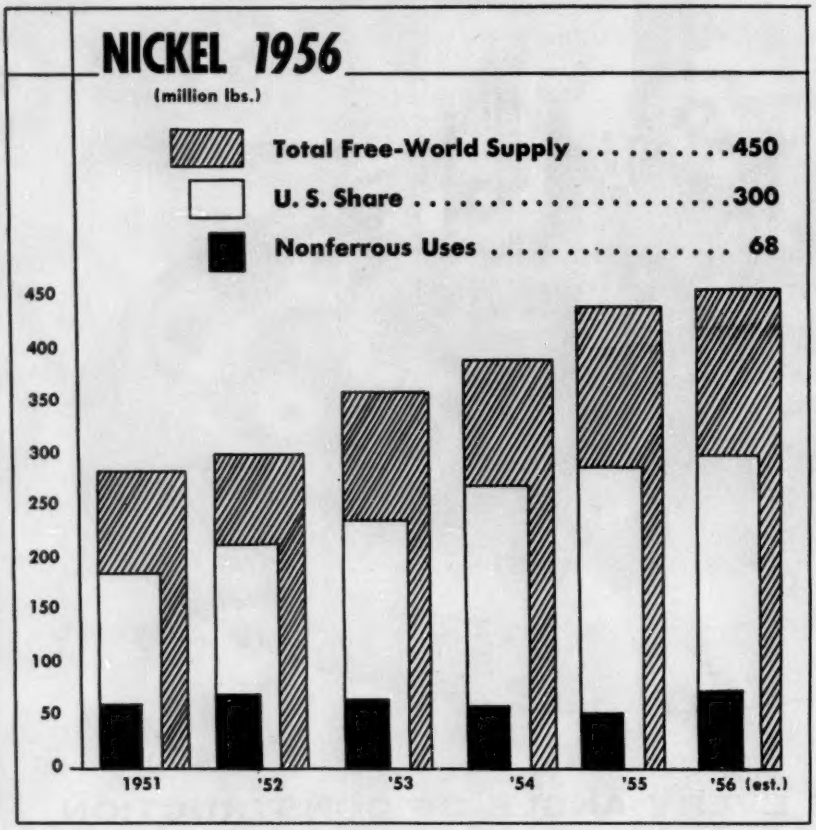
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Nickel Famine: How Long?

In these days of chemical plenty, the persistent shortage of nickel—and nickel derivatives—appears doubly acute, underlines the frustrating wail of supply-short consumers: "When will there be enough to go around?"

Further emphasizing the market conditions surrounding the prime plating and alloying metal are these late developments:

- An upcoming announcement that the government will boost the nickel capacity goal by as much as 150 million lbs./year.
- Charges in Congress by House Majority Leader John McCormack (Mass.) that a huge black market exists in nickel, and that federal authorities are failing to meet the situation effectively.
- Quizzing last week of Defense Mobilizer Arthur Flemming and Commerce Dept. officials, by the Joint Congressional Committee on Defense Production, on complaints that nickel acquired through defense-rated orders is finding its way into the "gray market."

Flemming had earlier disputed the charges of a black market, stated that there are no government controls on nickel prices; but he conceded that there is a shortage, and agreed that an investigation "might be very helpful in getting some of the facts on the table."

At that time, Flemming also stated that he saw little prospect of early relief from shortages, but contended that the situation is not as serious as some paint it.

Consensus of some trade followers appears to jibe with the ODM chief's views. With current U.S. consumption of nickel running at about a 300-million-lbs./year rate (*see chart*), few believe that the amount of "overpriced" nickel on the market exceeds a couple of million pounds. Most of this is entering the country from French, Japanese and West German sources, and is being marketed here at fancy prices simply because frantic U.S. consumers are hard pressed for requirements.

Currently heard quotes in the trade peg such premium-tagged material as high as \$2.50-\$3/lb., compared with domestic producers' schedules of 64½¢/lb.

Problem confronting users of nickel in all forms, including salt, oxides, and the metal (though nonferrous consumers are getting more this year), is that producers' necessary allocation systems preclude enough for nondefense outlets at the more reasonable price.

Why Short? New probes, queries and surveys emanating from Washington to root out the chief cause of the long-time nickel drought will likely only verify earlier findings—that the impact of the defense program, together with the government's stockpiling, is the main reason for the shortage.

But steps are already under way to eliminate the spread between nickel capacity and demand. Just about ready to roll is the near-75% expansion at the government's Nicaro, Cuba, plant, which is operated by National Lead and by Cuban interests. Output, now about 28 million lbs./year, will jump to some 50 million lbs.

Falconbridge Nickel, with 41 million lbs. in '55, will produce 45 million this year, and is aiming for a 55-million-lbs. capacity. Hanna Coal & Ore (Riddle, Ore.) is just onstream with a fourth furnace for production of ferronickel, will more than double its '55 output of nickel (about 6.5 million lbs.).

Add, too, the Sherritt Gordon operation in Canada, which is actually exceeding, by 3-4 million lbs., its earlier estimate (17 million) of productive capability. And International Nickel, which last year turned out a whacking 290 million lbs., is undertaking extensive exploration and underground drilling operations in Manitoba with an eye to extending nickel mining in that area.

Further, Freeport Sulphur and Bethlehem Steel are working on new

methods (sulfuric acid leaching) to process low-grade Cuban ore. Probable result: Freeport, for one, may be producing some 30 million lbs. of nickel by 1958.

But the pressure for adding nickel capacity to satisfy both defense and civilian requirements may be too great. At least one major distributor is posing a trade-jolting question: There may not be enough for all this year, and possibly not next year, but is there a nickel glut brewing for '60?

The President Reports...

By this week, Congress is aware of the nation's rubber requirements and resources, and knows, too, that commercial production of so-called synthetic "natural" rubber will be achieved by the rubber industry without special government aid.

Source of this information: President Eisenhower's message to Congress accompanying the report of a special interagency rubber study group.

According to the estimates prepared by the committee (headed by the Office of Defense Mobilization's Arthur Wolf), total U.S. demand for new rubber—natural and synthetic—by 1960 may reach some 1.7 million long tons/year. By Jan. 1, 1958, already planned expansions would bring synthetic capacity alone to that level.

The President told Congress on this first anniversary of the disposal of 24 of the 27 government-owned synthetic rubber facilities that these expansions reflect the policy of the industry to assure that future supplies of synthetic rubber will be ample to meet all requirements. This is the over-all view. Actually, productive capacity in this country for synthetic rubber isn't too far short of that '58 expectation right now. As of the end of last year, capacity was already more than 1.26 million tons.

Where To? Assuming regular continuance of the average percent rate of increase of the past few years (about 3.5%), the rubber study group outlined this probability for near-term consumption: the five-year total for 1956-60 is indicated at 7,818,000 long tons, an annual average of 1,563,600 tons. Indicated annual totals: 1956—1,458,000; 1957—1,507,000; 1958—

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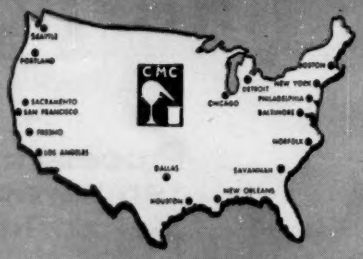
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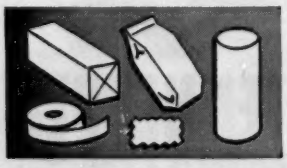
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1,562,000; 1959—1,616,000 long tons.

But, cautions the commission, it would be unrealistic to expect regularity in the progression in U.S. annual consumption. In the past, for example, although the trend of new rubber consumption was upward, it was irregular. Use (since 1947) ranged from a low of 989,000 tons in '49 to a high of 1,530,000 in '55.

This high demand last year caused domestic producers of all synthetic rubbers—except butyl—to push for maximum output.

Butadiene Breakdown: Almost 90% of total butadiene output goes into S-type rubber production; so its outlook, too, was scouted in the 21-page survey for the President. Planned expansions of the petroleum-base butadiene facilities through extensions, alterations and new construction reported by the industry total 110,800 short tons this year, and an additional 168,500 tons in '57. Add these to the expanded capacity reported by private producers at the end of '55, about 661,000 short tons, and it totes up to approximately 940,000 short tons of butadiene available by the end of '57.

Man-Made Natural: The President noted, too, that the special commission "goes beyond the subject of research and urges that immediate consideration be given, at the highest government level, to the question of whether the national security requires governmental action to foster the industrial development of the new process of synthesizing 'natural' rubber. The commission had earlier observed that three companies had reported success in synthesizing material with composition and properties similar to natural rubber."

The President pointed out that pilot plants are already being privately constructed, though it appears unlikely that large-scale commercial production will be undertaken for a few years.

The U.S., of course, already has an adequate stockpile of natural rubber, thus nullifying any immediate security problem.

But although the President did rule out the need for any unique measures, such as would require new legislation, he told Congress that the government already has available a number of means of assisting industrial development and expansion where such aid is found to be essential to national security.



Plastic Boats: Skim to Landing

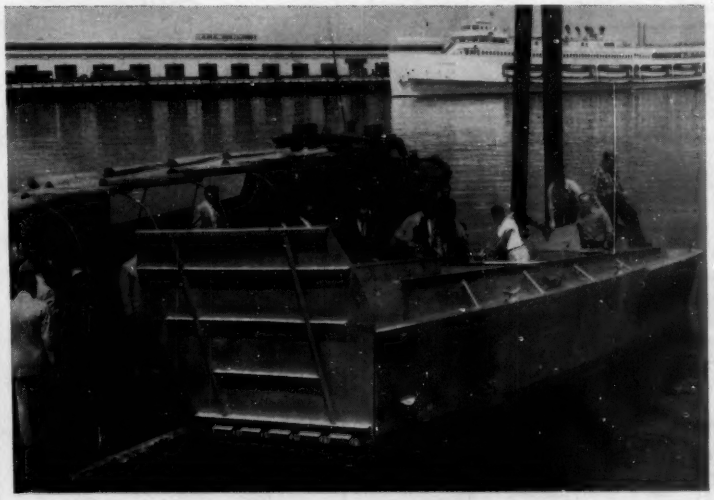
NAVY LANDING CRAFT (*below*) may appear to have little in common with self-propelled skim boats (*above*); yet, both are almost entirely of fiberglass-polyester resin construction.

Currently undergoing tests by the Navy, each 36-ft. LCVP contains over 2,000 lbs. of resin in the hull, deck slats, aft deck, coaming and bulkhead (¼-in.-thick ballistic steel panels along the sides give shrapnel protection).

Advantages over wood or metal craft include weight savings, and resistance to corrosion, dry rot, fungus and termite attacks.

The initial order for 50 boats will be filled by Lunn Laminates (Huntington, N.Y.) and Zenith Plastics (Los Angeles); but bigger orders may be on the way, since the Navy buys up to 1,000 LCVPs each year.

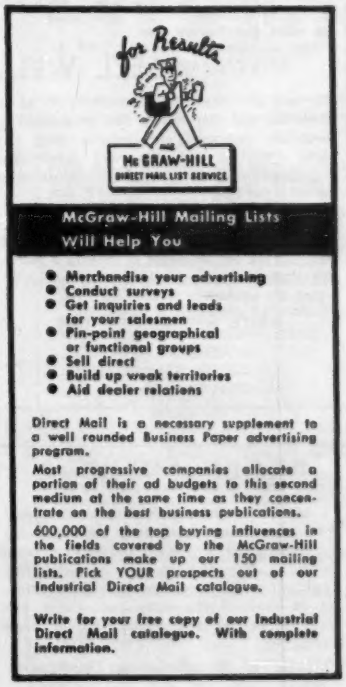
For the civilian market, something new has been added to skim boats, which were unveiled earlier this year (*CW, Jan. 28, p. 84*); overlays of dynel (Carbide's acrylic fiber) now improve corrosion and abrasion resistance of the hulls of polyester fiberglass laminate.





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CHEMICAL WEEK • ADVERTISERS INDEX

May 19, 1956

ALLIS CHALMERS MANUFACTURING CO. 50-51
Agency—Compton Adv. Inc.

AMERICAN CAN CO. 83
Agency—Compton Adv. Inc.

AMERICAN CYANAMID CO. 4
Agency—Hazard Adv. Co

AMERICAN FLOOR SURFACING CO. 144
Agency—Beeson-Reichert, Inc.

AMERICAN MINERAL SPIRITS CO. 13
Agency—Leo Burnett Co., Inc.

AMERICAN POTASH & CHEMICAL CORP. 40
Agency—The McCarty Co.

ARCHER DANIELS MIDLAND CO. 109
Agency—The Bayless-Kerr Co.

BADGER MANUFACTURING CO. 121
Agency—F. P. Walther Jr. & Assoc.

BAKELITE CO., DIV. OF UNION CARBIDE & CARBON CORP. 75
Agency—J. M. Mathes, Inc.

BAKER PERKINS, INC. 112
Agency—Price, Tanner & Willox, Inc.

BALTIMORE & OHIO RAILROAD 146
Agency—Richard A. Foley Adv.

BARRETT DIV., ALLIED CHEMICAL & DYE CORP. 79
Agency—McCann-Erickson, Inc.

BAYONNE INDUSTRIES, INC. 23
Agency—Robert Conahay, Inc.

BEMIS BRO. BAG CO. 128
Agency—Gardner Adv. Co.

BLOCKSON CHEMICAL CO. 89
Agency—William Balsam, Adv.

BORDEN CO., CHEMICAL DIV., AMERICAN RESINOUS CHEMICALS CORP. 157
Agency—Bennett & Northrop, Inc.

BRADLEY CONTAINER CORP. 62
Agency—Cooney & Conner, Adv.

CARBIDE & CARBON CHEMICALS CO., DIV. OF UNION CARBIDE & CARBON CORP. ..... 54, 4th Cover
Agency—J. M. Mathes, Inc.

CELANESE CORP. OF AMERICA 6-7
Agency—Ellington & Co., Inc.

CHEMICAL CONSTRUCTION CORP. 41
Agency—Michel-Cather, Inc.

CHEMICAL MANUFACTURING CO. 157
Agency—The House of J. Hayden Twiss

CHEMICAL WEEK BUYER'S GUIDE 110

CHICAGO BRIDGE & IRON CO. 42
Agency—Russell T. Gray, Inc.

CLARK EQUIPMENT CO. 123
Agency—Marsteller, Rickard, Gebhardt & Reed, Inc.

COLUMBIA SOUTHERN CHEMICAL CORP. 99
Agency—Ketchum, MacLeod & Grove, Inc.

COMMERCIAL SOLVENTS CORP. 3
Agency—Fuller & Smith & Ross, Inc.
Agency—Jerry Bryant, Adv.

CORNING GLASS WORKS 139
Agency—Charles L. Rumrill & Co., Inc.

COVER, H. S. 156

DAY CO., INC., THE J. H. 130
Agency—Stauchen & McKim, Adv.

DELTA CHEMICAL WORKS 124
Agency—Miller Adv. Agency

DIAMOND ALKALI CO. 120
Agency—Fuller & Smith & Ross, Inc.

DICALITE DIV., GREAT LAKES CARBON CORP. 92
Agency—Darwin H. Clark Co.

DISTILLATION PRODUCTS INDUSTRIES, DIV. OF EASTMAN KODAK CO. 60
Agency—Charles L. Rumrill & Co., Inc.

DOW CHEMICAL CO., THE 57, 141
Agency—MacManus, John & Adams, Inc.

DOWELL INC. 1
Agency—MacManus, John & Adams, Inc.

DU PONT DE NEMOURS & CO., INC., E. I., ORGANIC CHEMICALS DIV. 131
Agency—Batten, Barton, Durstine & Osborn, Inc.

DU PONT DE NEMOURS & CO., INC., E. I., PLASTIC SALES DIV. 39
Agency—Batten, Barton, Durstine & Osborn, Inc.

DUREZ PLASTICS DIV., OF HOOKER ELECTROCHEMICAL CO. 108
Agency—Comstock & Co.

EASTMAN CHEMICAL PRODUCTS, INC. 49
Agency—Fred Wittner, Adv.

EMERY INDUSTRIES, INC. 145
Agency—Ruthrauff & Ryan, Inc.

ESSO STANDARD OIL CO. 65
Agency—McCann-Erickson, Inc.

EVANS RESEARCH & DEVELOPMENT CORP. 88
Agency—Ritter, Sanford & Price, Inc.

FIRESTONE TIRE & RUBBER CO. 127
Agency—Sweeney & James Co.

FOSTER WHEELER CORP. 150
Agency—Marsteller, Rickard, Gebhardt & Reed, Inc.

FRITZSCHE BROTHERS, INC. 140

GENERAL AMERICAN TRANSPORTATION CORP. AIRSLIDE CARS DIV. 2
Agency—Weiss & Geller, Inc.

GENERAL AMERICAN TRANSPORTATION CORP., TERMINAL DIV. 53
Agency—Weiss & Geller, Inc.

GENERAL ELECTRIC CO. 90-91
Agency—G. M. Basford Co.

GIRDLER CO., THE 61
Agency—The Griswold-Eshleman Co.

GLYCERINE PRODUCERS ASSOC., INC. .. 93
Agency—G. M. Basford Co.

GLYCO PRODUCTS CO., INC. 78
Agency—G. M. Basford Co.

GROSS & CO., A. 126
Agency—G. M. Basford Co.

HALL CO., THE C. P. 100
Agency—Cruttenden & Eger, Assoc.

HAMMOND BAG & PAPER CORP. 124
Agency—Ciangio Adv., Inc.

HARRINGTON & CO., J. J. 126
Agency—Merchandising Advertisers, Inc.

HERCULES POWDER CO. 80-81
Agency—Fuller & Smith & Ross, Inc.

HILLS McCANNA CO. 66
Agency—Russell T. Gray, Inc.

INLAND STEEL CONTAINER CO. 149
Agency—Weiss & Geller, Inc.

INTERNATIONAL SALT CO., INC. 143
Agency—Batten, Barton, Durstine & Osborn, Inc.

JEFFERSON CHEMICAL CO., INC. 67
Agency—Hazard Adv. Co.

KELCO CO., INC. 76
Agency—Cayton, Inc., Adv.

KELLOGG CO., THE M. W. ..... 3rd Cover
Agency—Fuller & Smith & Ross, Inc.

LINDE AIR PRODUCTS CO., DIV. OF UNION CARBIDE & CARBON CORP. .. 101
Agency—J. M. Mathes, Inc.

McGRAW-HILL BOOK CO. 147

MAAS CHEMICAL CO., A. R. 147
Agency—Heintz & Co., Inc.

MARATHON CORP. 106
Agency—Cormack-Imse-Beaumont, Adv.

MATHESON CO., THE 148
Agency—Firestone Adv. Agency

MERCHANTS CHEMICAL CO., INC. 134
Agency—G. M. Basford Co.

METAL HYDRIDES, INC. 148
Agency—Creamer-Trowbridge Co.

METAL & THERMIT CORP. 74
Agency—RAF Advertising, Inc.

MICHIGAN CHEMICAL CORP. 132-133
Agency—Wesley Aves & Assoc., Inc.

MINERALS & CHEMICALS CORP. OF AMERICA 125
Agency—Richardson, Thomas & Bushman, Inc.

MUTUAL CHEMICAL DIV., ALLIED CHEMICAL & DYE CORP. 11
Agency—The House of J. Hayden Twiss

NATIONAL ENGINEERING CO. 55
Agency—Russell T. Gray, Inc.

NATIONAL PETRO CHEMICAL CORP. 96
Agency—G. M. Basford Co.

NEVILLE CHEMICAL CO. 87
Agency—Bond & Starr, Inc.

NITROGEN DIV., ALLIED CHEMICAL & DYE CORP. 15
Agency—G. M. Basford Co.

OHIO APEX DIV. OF FOOD MACHINERY & CHEMICAL CORP. 15
Agency—Advertising, Inc.

OLIN MATHIESON CHEMICAL CORP. 24
Agency—Doyle, Kitchen & McCormack, Inc.

ORONITE CHEMICAL CO. 35
Agency—L. C. Cole Co., Inc.

PENNSYLVANIA INDUSTRIAL CHEMICAL CORP. 43
Agency—Downing Industrial Adv., Inc.

PENNSYLVANIA REFINING CO. 111
Agency—Downing Ind. Adv.

PETRO-CHEM DEVELOPMENT CO. 107
Agency—Sam J. Gallay, Adv.

PETRO-TEX CHEMICAL CORP. 77
Agency—James J. McMahon, Inc.

PFAUDLER CO., THE 137
Agency—Charles L. Rumrill & Co., Inc.

POLYVINYL CHEMICALS, INC. 136
Agency—Creamer-Trowbridge Co.

PROCON, INC. 153
Agency—Sam J. Gallay, Adv.

PUBLICKER CHEMICAL CORP. 28-29
Agency—Al Paul Lefton Co., Inc.

REICHHOLD CHEMICALS, INC. 116-117
Agency—MacManus, John & Adams, Inc.

REYNOLDS METALS CO. 68
Agency—Clinton E. Frank & Co., Inc.

RHEEM MANUFACTURING CO. 129
Agency—Campbell-Ewald Co., Inc.

RICHARDSON SCALE CO. 86
Agency—O. S. Tyson, Inc.

RODNEY HUNT MACHINE CO. 105
Agency—John Mather Lupton Co.

ROHM & HAAS CO. 73
Agency—Arndt, Preston, Chapin, Lamb & Keen, Inc.

SHELL OIL CO. 71
Agency—J. Walter Thompson Co.

SMITH, INC., WARNER G. 38

SOHIO CHEMICAL CO. 48
Agency—Klaw-Van Pieterson-Dunlap, Inc.

SOLVAY PROCESS DIV., ALLIED CHEMICAL & DYE CORP. ..... 2nd Cover
Agency—Atherton & Currier, Inc.

SONNEBORN SONS, INC., L. 30
Agency—St. Georges & Keyes, Inc.

SOUTHERN STATES IRON ROOFING CO. 58
Agency—George & Glover, Inc.

SPENCER CHEMICAL CO. 115
Agency—Bruce B. Brewer & Co.

SPERRY & CO., D. R. 140
Agency—Illinois, Simmonds & Simmonds, Inc.

TENNESSEE PRODUCTS & CHEMICAL CORP. 155
Agency—The Griswold-Eshleman Co.

TITANIUM PIGMENTS CORP. 27
Agency—Doyle, Kitchen & McCormack, Inc.

TOTE SYSTEN, INC. 64
Agency—Ayres, Swanson & Assoc., Inc.

UNITED BOX & LUMBER CO. 144
Agency—Ira S. Kahn & Co.

UNITED INTERNATIONAL RESEARCH CORP. 5
Agency—Dowd, Redfield & Johnstone, Inc.

U.S. POTASH CO. 136
Agency—McCann-Erickson, Inc.

VANADIUM CORP. OF AMERICA 72
Agency—Hazard Adv. Co.

VOGT MACHINE CO., HENRY 45
Agency—Farson, Huff & Northlich Adv.

VULCAN COPPER & SUPPLY CO., THE .. 14
Agency—L. F. McCarthy & Co.

WARWICK WAX CO. 44
Agency—G. M. Basford Co.

WILNER WOOD PRODUCTS CO. 70
Agency—Sliton Brothers, Inc.

WITCO CHEMICAL CO. 94-95
Agency—Hazard Adv. Co.

WYANDOTTE CHEMICAL CORP. .. 59, 102-103
Agency—Brooke, Smith, French & Dorrance, Inc.

tracers SECTION
(Classified Advertising)
F. J. Eberle, Business Mgr.

CHEMICALS: Offered/Wanted 159
EMPLOYMENT 158
EQUIPMENT: Used/Surplus New
For Sale 159
WANTED 159
MANAGEMENT SERVICES 159
SPECIAL SERVICES 159

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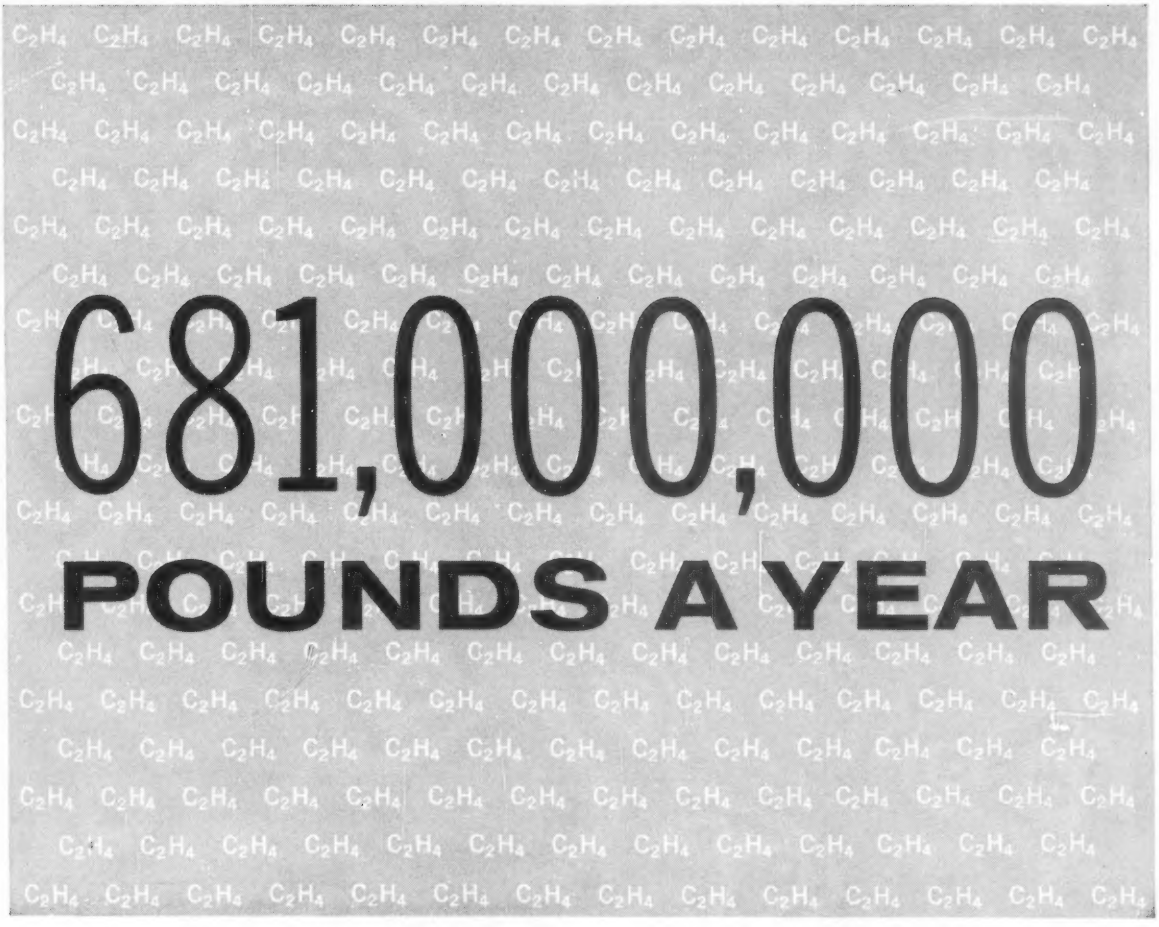
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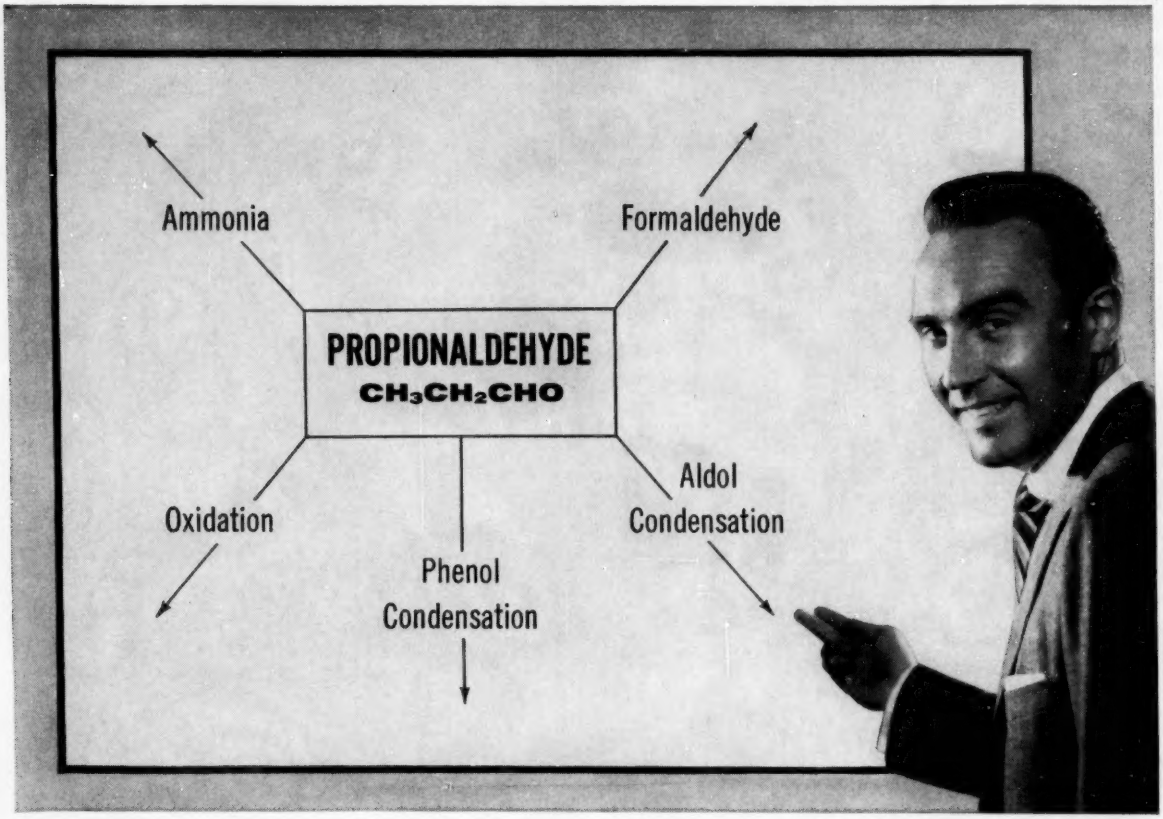
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